AD-A140 337 LGM-30B STAGE II DISSECTED MOTOR TEST REPORT(U) OGDEN AIR LOGISTICS CENTER HILL AFB UT PROPELLANT ANALYSIS LAB E M DALABA FEB 84 MANPA-496(84) 1/3

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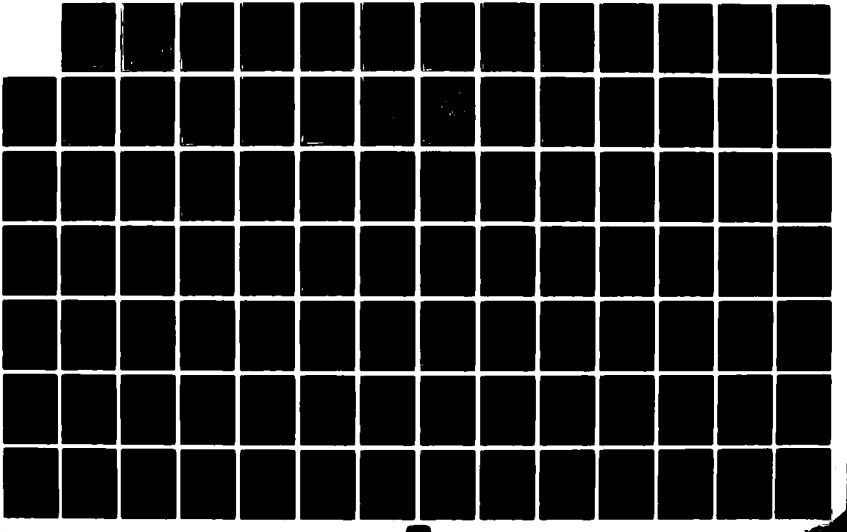

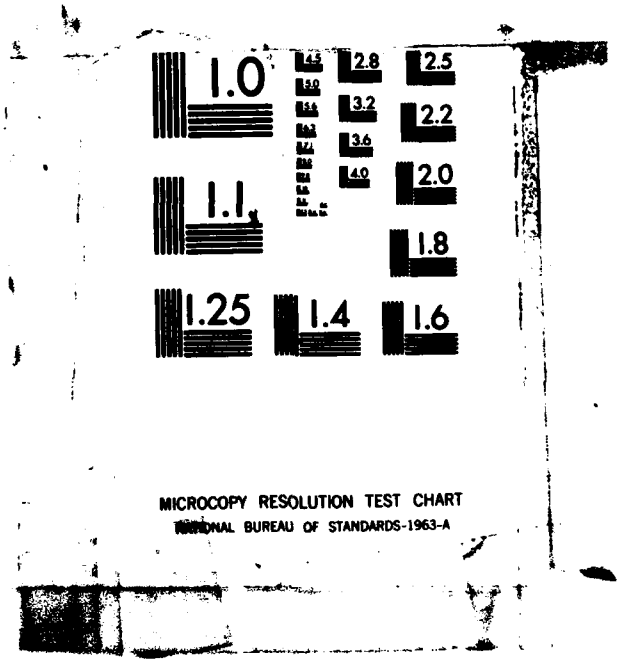
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NATIONAL BUREAU OF STANDARDS-1963-A

HEADQUARTERS
OGDEN AIR LOGISTICS CENTER
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HILL AIR FORCE BASE, UTAH 84056

LGM-30B
STAGE II
DISSECTED
MOTOR
TEST REPORT

PROPELLANT ANALYSIS LABORATORY

MANPA REPORT NR 496(84)

February 1984

MANPA REPORT NR 496(84)

LGM-30B, STAGE II

DISSECTED MOTOR

TEST REPORT

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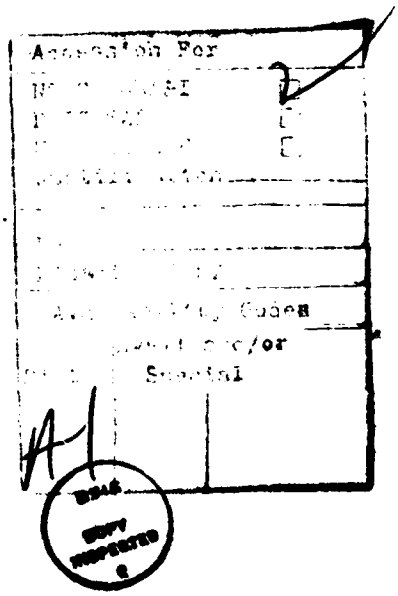

ABSTRACT

Data analysis in this report is the culmination of testing on three dissected motors, as well as two test periods for a fourth dissected motor.

In order to relate the newest dissected motor to previously dissected motors, an analysis of covariance was performed. The new data was subjected to a determination of significance of means and variance. Regressions of individual motor trends for many parameters are included in this report.

Although these individual regressions do show some significant trends, it does not appear that age-out is imminent.

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LGM-30 Stage II Dissected Motors Test Report 338(76)	May 1976
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LGM-30B Stage II Dissected Motors Test Report 443(80)	Jul 1980

INTRODUCTION

PURPOSE: The purpose of this program is to continue surveillance testing of Minuteman Reentry System Launch Program Stage II propellant. This surveillance will elucidate the aging characteristics of the propellant and, using statistical trends derived from laboratory testing, will help to establish the service life expectation of similar motors in the inventory.

BACKGROUND: Surveillance testing was initiated in 1963 on cartons of propellant cast from the same propellant used in motor manufacture.

In 1971, all laboratory prepared insulation material and case-to-propellant bond specimens were destroyed in a conditioning chamber malfunction. The number of cartons of propellant were also near depletion, which would have terminated the surveillance program.

A force modernization program made available some older Minuteman I Stage II motors. Three of these motors were selected to represent the motor inventory and were dissected for laboratory surveillance testing. The motors selected were S/N 0022135, cast date June 1963; S/N 0022583, cast date January 1964; and S/N 0022788, cast in July 1964. An additional motor, S/N 0022687, cast in April 1964, became available and was dissected in 1981 for continuing surveillance testing.

MANPA Report 384(77) was the last time that carton data was combined with dissected motor data. Since that time, sufficient dissected motor data have been available for testing and statistical analysis. The test data from Stage II dissected motors were assumed to have a normal population that could be combined. This report demonstrates this to be a false assumption.

The amount of propellant available from motor S/N 0022583 was sufficient for only four test periods. Motors S/N 0022135 and 0022788 contained sufficient propellant for seven (7) test periods. These assets

have been depleted

No insulation materials from the three motors were available for testing since all materials were depleted during the fourth test period.

Test conditions and test parameters have changed since the inception of the program to improve or provide better test techniques or state-of-the-art. Limited data are available for some parameters and is evident in some of the regressions.

Motor S/N 0022687 was dissected in a different manner than other motors. The distance between cuts B and C, and cuts C and D was increased to 16 inches (figures 1 and 2).

Motors which have been dissected to date are:

Motor S/N	Cast Date
0022135	63162
0022583	64008
0022788	64197
0022687	64096

Segments A, B, and C from section 4 of motor S/N 0022687 were used for testing. The samples were cut in their respective orientation as illustrated in figure 3. Figure 4 illustrates the cutting plan for the latest test period.

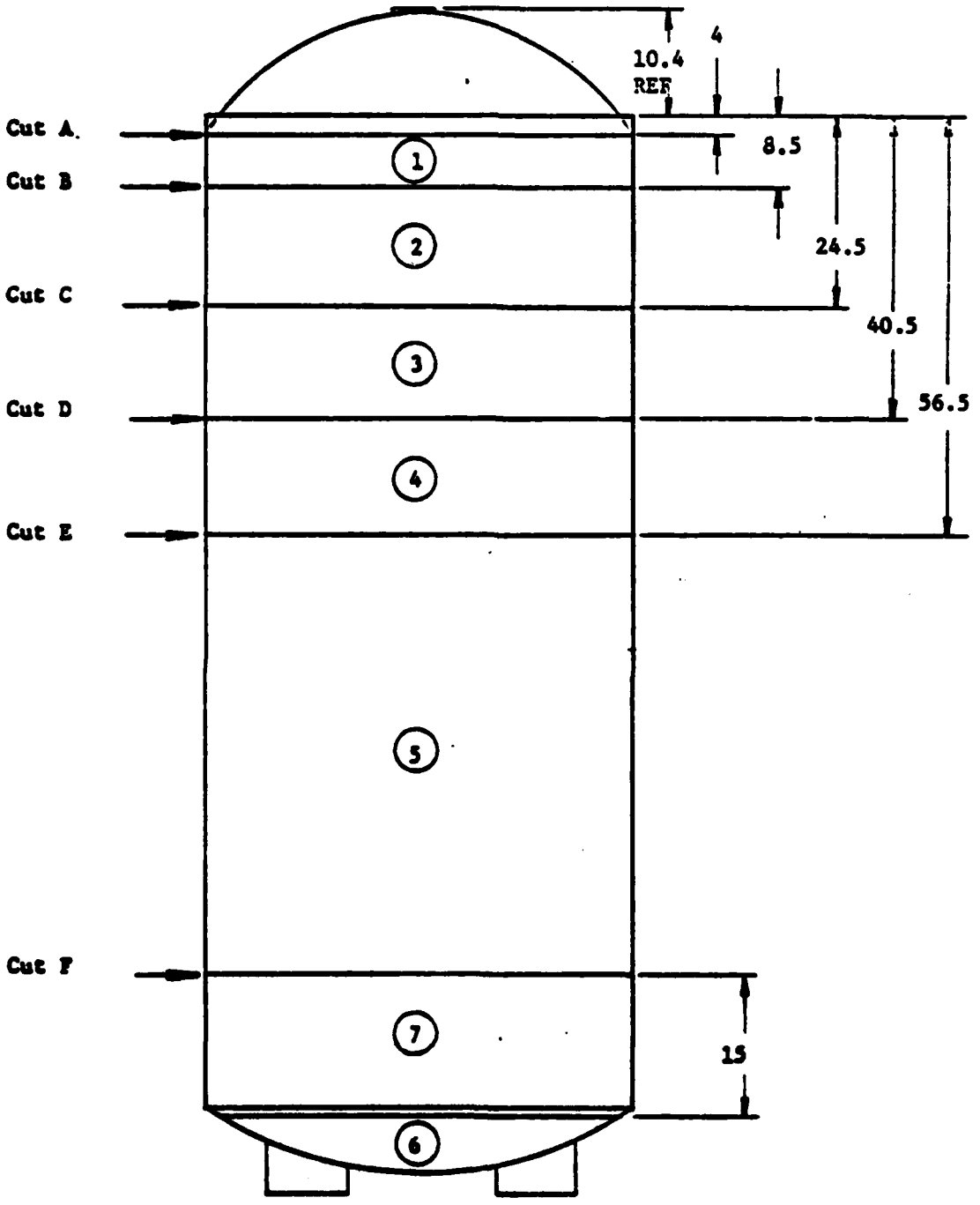


Figure 1 Dissection layout of Cuts, Locations and Section Numbers

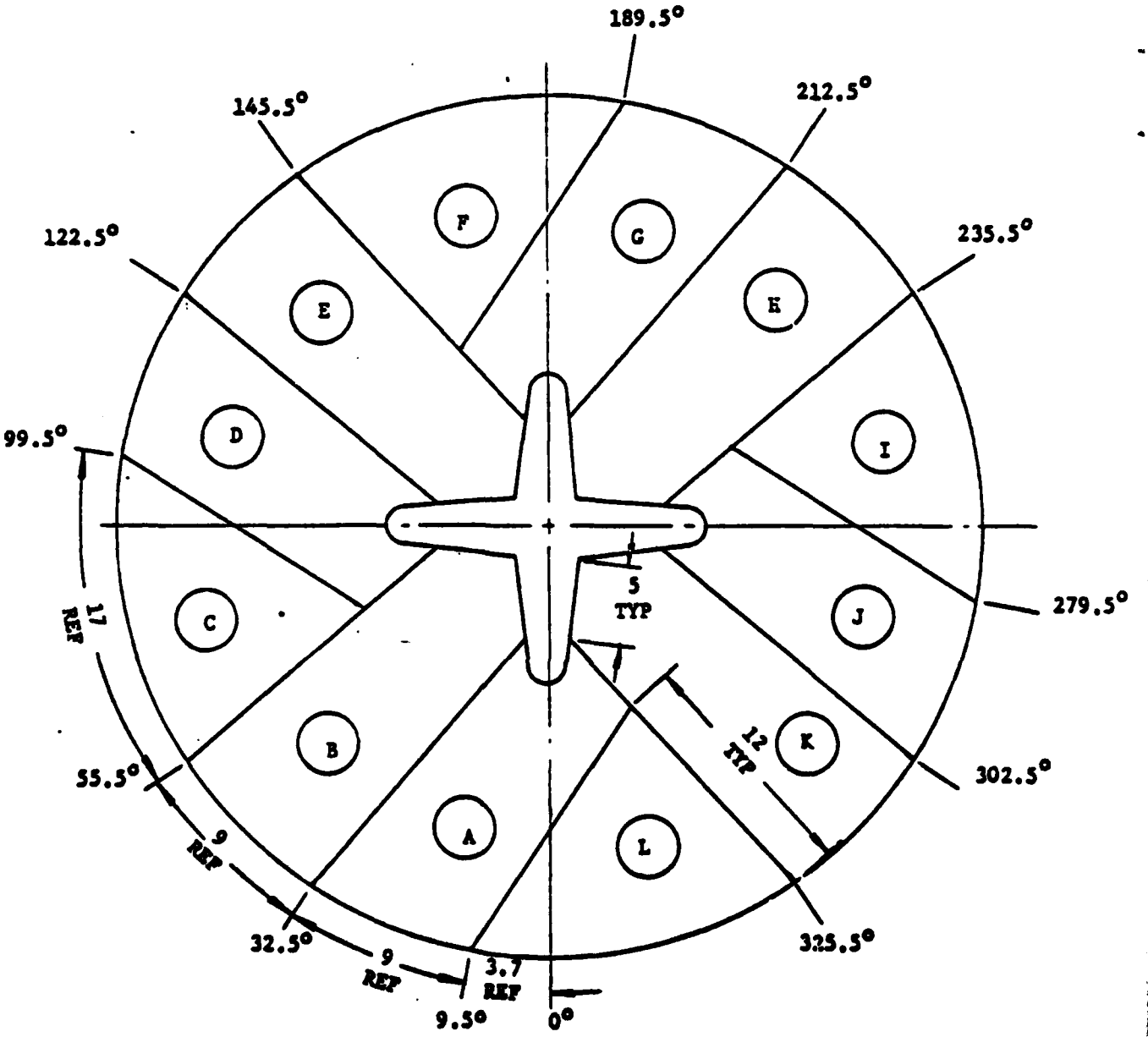


Figure 2 Section 3 and 4 Segment Layout and Letter Identification

This figure illustrates what the various sample orientation terms mean with respect to a segment of the motor.

A JANNAF dogbone is used in the illustration to depict the areas from where the specimens are obtained.

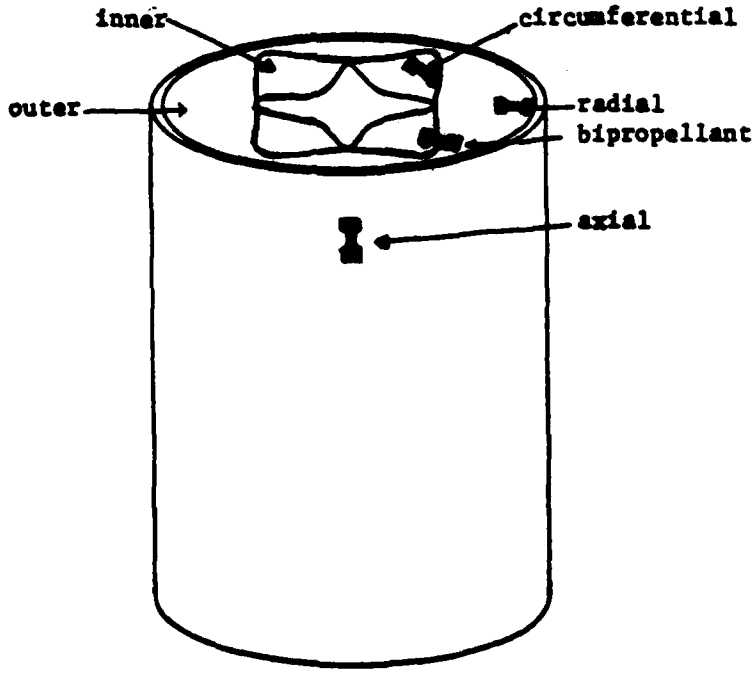
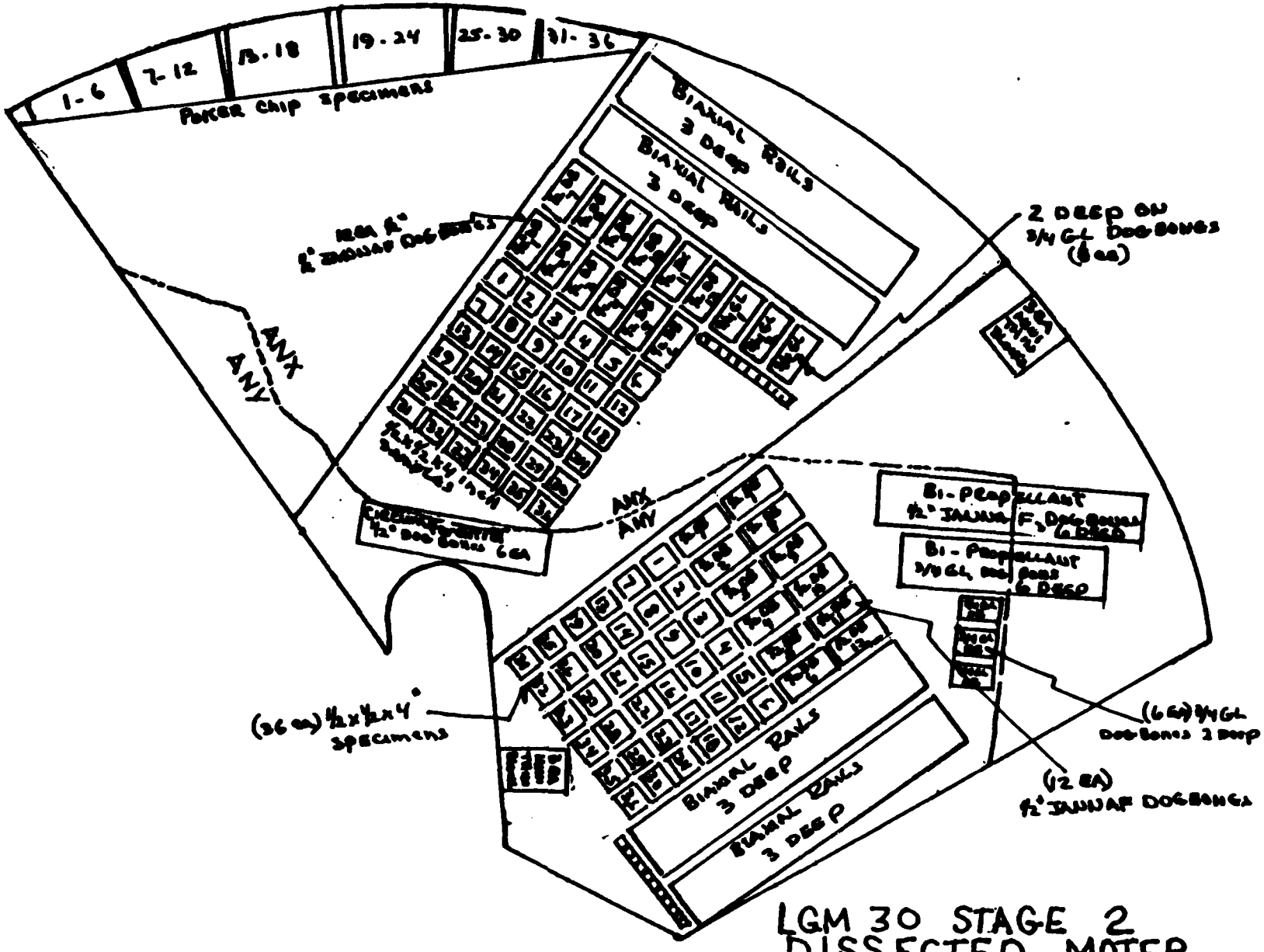


FIGURE 3



LGM 30 STAGE 2
DISSECTED MOTER
CUTTING PLAN

Figure 4

STATISTICAL ANALYSIS

The objective of this statistical analysis is to determine whether or not any aging trends are demonstrated by accumulated test data in order to assist Service Engineering to more accurately predict motor serviceability.

Testing and statistical analysis were performed to obtain an overall view of the aging trends affecting the Stage II Dissected motor program.

For this test period, analyses were made to determine: (1) what aging trends are demonstrated for motor 0022687 data within two test periods (1982 and 1983) and (2) the relationship between the data from motor S/N 0022687 and data from previously dissected motors 0022135, 0022583 and 0022788.

At the present time there are only two data points for motor 0022687, therefore a regression analysis would not be acceptable and it became necessary to relate the data to other dissected motors.

The data from motor 0022687 covering two test periods were statistically compared for combinability by comparing data variations (F test) and mean values (t test) of each test period at the 5% significance level (Table 1). There are 13 different tensile tests and five parameters per test. Thus, there are a total of 65 comparisons with an average of 7.9 samples per test period. The variance comparison resulted in 17 tests significantly different and 48 tests non-significant. The mean comparisons for those 48 tests with a non-significant variance resulted in 32 tests significantly different and 16 tests with no significant differences between means. Tensile testing comparisons resulted in significant differences from variance testing and mean testing. Sixteen out of 65, or 24.62% have a non-significant difference and data are combinable.

Stress relaxation testing uses two strain rates for two propellants at

five temperatures. Moreover, four times, in seconds, have been selected for comparison giving a total of 80 comparisons. An average of 3 samples per test period represents a small sample size. The variance comparison (F test) resulted in 34 tests significantly different and 46 tests non-significant. The mean comparison (t test) for those 46 tests with a non-significant variance, resulted in 30 tests significantly different and 16 tests non-significantly different between means. Stress relaxation comparisons resulted in 16 out of 80 or 20% indicating a non-significant difference, and these data are combinable.

For hardness, burn rate, and TCLE testing there are 8 comparisons with an average of 5.5 samples per test period, a marginal sample size. The variance comparison resulted in 3 tests significantly different and 5 tests non-significant. The mean comparisons for the 5 tests with a non-significant variance resulted in one test being significantly different and 4 tests non-significant between means. Test results for variance and mean show 4 out of 8 or 50% show a non-significant difference and data are combinable.

The results in the over all comparison testing of data from motor S/N 0022687 statistically indicates some factor has changed the propellant in 15 months time. These changes may be attributed to storage conditions, humidity or personnel change and are being investigated.

In 1977, using propellant from Stage II dissected motors, a normal distribution of the population was assumed (an assumption later proved invalid). Multiple type regressions, using a unique plotting code for each motor (combining data from all dissected motors into one regression) was the method of reporting the test results due to the small amount of data available for each motor. Because of this type reporting, masking of individual motor trends was possible and has been stated in previous reports as such. At the present, with more accumulation of data and improved sta-

tistical tools, individual motor variances and masking have now become obvious within the combined composite regression plots. All combined composite regression plots, using unique plotting codes for each motor, have been included to allow a visual display of the over all relationship between motors.

The data from composite regression plots have been subdivided into separate individual motor regression plots. A selected sample of these individual motor regressions were then tested for the statistical ability to combine these separate regressions to create a composite regression at the 5% significance level. A newly implemented Analysis of Covariance computer program was developed for this purpose. First, the data variance around the trend lines is compared if the variance is non-significant. The trend lines slope and elevation is then tested for combinability. Out of a total of 14 different tests currently used on this propellant, 5 tests were selected or 22 comparisons. All had a significant relationship and statistically should not be combined. Each motor must be individually plotted and analyzed to eliminate errors and provide meaningful regressions. The composite plots in this report show the relationship between the earlier dissected motors and motor 0022687.

Table 2 contains the Analysis of Covariance results for five tests.

The motor-to-motor relationships and direction of regression trend line slopes may be found in Table 3. Table 3 also identifies areas in which the composite plots have been masking individual motor trends. Such an example is very low rate tensile maximum stress on the outer propellant at 0.0002 in/min, where the combined composite regression trend line has a non-significant slope. However, the trend line for motor 0022135 has a negative slope. There are many cases of the composite plots masking the individual motor trends found in Table 3.

DEFINITION OF THE MASTER STRESS RELAXATION CURVE

The master stress relaxation curve is a composite curve representing the behavior of a polymer over a wide range of time and temperature relationships. From a curve constructed at a given strain level, any combination of time and temperature can be used to determine a corresponding stress relaxation modulus.

DETERMINATION OF STRESS RELAXATION MODULUS USING A MASTER STRESS RELAXATION CURVE

From test data at a particular strain level, a polymer's stress relaxation modulus corresponding to any combination of time and temperature can be determined. The horizontal axis of the master stress relaxation plot is a logarithmic value (t/a_T), and the vertical axis is a linear value, E(t) 298/T, where E(t) is the stress relaxation modulus dependent on time. T is temperature in degrees Kelvin, a_T equals any relaxation time at temperature T divided by the corresponding time at the reference temperature (298 degrees Kelvin or 77°F), and 't' is relaxation time in seconds. The stress relaxation modulus for any combination of temperature and time can be determined by using the following steps:

a. For each stress relaxation plot there is associated a plot of temperature in degrees F versus log a_T. From this plot, determine log a_T corresponding to the temperature at which stress relaxation modulus is desired.

b. Determine log 't' or log of the desired stress relaxation time.

c. Determine log (t/a_T) by using the equation:

$$\log (t/a_T) = \log t - \log a_T.$$

d. Place the determined value of log (t/a_T) in the horizontal axis of the large plot and reference the master stress relaxation curve to determine the corresponding value E(t)298/T in the vertical axis.

e. Determine 298/T and divide into E(t)298T to find E(t), the stress relaxation modulus at the desired time and temperature.

TEST RESULTS

INTRODUCTION:

Testing of only one motor at this test period required a different statistical approach. Means and variance were analyzed for the 1982 and 1983 test data. This type of analysis will track any change between the data from the two test periods. Table 1 shows the significance, or non-significance, of means and variance. From the table, it can be seen that few comparisons are not significant in either means or variance. This comparison resulted in further data analysis.

Combined regressions, using other dissected motor data, were made to show the relationship of data from motor 0022687 to the other motors since a regression using two points is meaningless.

Table 3 shows the significance of slopes for the combined multiple regressions and for each of the three previously dissected motors. This tabular presentation makes it clear that there are significant differences between motors. This current analysis completes the data package on these motors.

Tables 4 and 5 give a presentation of the tensile data on motor S/N 0022687 for two test periods. Table 6 gives stress relaxation data, while Table 7 lists data for miscellaneous test parameters.

A. UNIAXIAL TENSILE TEST:

Motor 0022687 outer propellant shows an apparent increase in all parameters except modulus at very low rate. At 2.0 in/min, there is an apparent decrease except for strain at rupture (Table 4). Figures 5 through 16 and figures 29 through 40 show all these parameters for all motors.

Inner propellant at both crosshead speeds shows an apparent decrease in all parameters except modulus. Figures 17 through 28 and figures 41 through 52 are regressions for inner propellant on all motors.

B. BIAXIAL TENSILE TEST:

For the outer propellant from motor 0022687, the composite regression visually shows an increase in all parameters. Inner propellant, although not statistically verified, shows an increase in strain and modulus with a slight decrease in stress. Outer propellant regressions are shown in figures 53 through 64 and inner propellant for all motors in figures 65 through 76.

C. HIGH RATE HYDROSTATIC UNIAXIAL TENSILE:

Motor 0022687 outer propellant shows essentially no change except for a decrease in modulus. Inner propellant shows a significant change in all parameters. Regressions for all motors are shown in figures 77 through 100. There was no change in strain at rupture in any motor. The maximum stress for the individual motor regressions except for motor 0022135, inner propellant, is increasing significantly with age. The modulus for all the individual motor regressions is also increasing with age.

D. CIRCUMFERENTIAL TENSILE:

This test has been limited to inner propellant. At 0.0002 in/min, there is a significant difference in means for all parameters for motor 0022687. At 2.0 in/min, only modulus does not show a significant change in means. Figures 101 through 112 represent regressions of available data for this test. There are few significant changes in the individual motor regressions.

E. BI-PROPELLANT TENSILE:

Very low rate testing on motor 0022687 showed an apparent increase in all parameters except modulus. This is probably not a real change since trends in the other motors are mostly not significant (figures 113 through 121).

For motor 0022687, the apparent increase in strain and decrease in stress and modulus under hydrostatic conditions are probably not significant (Table 5). There exists only a limited amount of data for this test so there are no regressions.

F. MINITHIN TENSILE:

Minithin tensile specimens are used to measure changes in properties across a gradient. The possibility exists for migration of ingredients from insulation and liner into the propellant, or from the propellant into the insulation and liner. There is also a possibility of propellant from the bore (inner) to show changes across a gradient. Very little data has been acquired from this test (only two test periods). A mean of all the values across the gradient for each block is given in Table 5. No noticeable trend exists in the gradient. There are no regressions for this test.

G. STRESS RELAXATION PROPERTIES:

Stress relaxation data for motor 0022687 are provided in Table 6. A comparison of the significant changes are provided in Table 1.

At -65°F, all specimens exhibited bond failure, a condition which sometimes occurred at -40°F. Only data at 77°F are adequate for regression.

Combined regressions for outer propellant are shown in figures 122 through 129. Figures 130 through 137 show combined regressions for inner propellant.

Master curves, as explained in the statistical portion of the report, are also included for 1983 testing of motor 0022687. These are given in figures 138 through 141. Insufficient data points could result in sharp regression trend slopes, but the master curves indicate no problem in stress relaxation at this time.

H. BURN RATE:

Burn rate is compared in Table 7. Both outer and inner propellant show faster burning than in 1982 testing. Regressions for all motors are given in figures 142 through 148. A significantly faster burning rate for motor 0022687 would be consistent, at least for inner propellant, with other dissected motors.

I. THERMAL COEFFICIENT OF LINEAR EXPANSION (TCLE):

The 1983 data for motor 0022687 shows no significant change for outer or inner propellant for the two parameters measured. The net effect of the slight decrease in TCLE below Tg for outer propellant changes the total regression from significant to non-significant. Regressions for this parameter are shown in figures 149 through 152. TCLE above Tg shows a significant increase (figures 153 through 156). For inner propellant there are changes both in significance and slope depending upon the motor (figures 157 through 164).

J. HARDNESS:

Shore A hardness for outer propellant in motor 0022687 appears to decrease and for inner propellant it appears to increase. Two of the other three dissected motors show a significant decrease in hardness at both initial and 10 seconds (figures 165 thru 168 and 173 thru 176) for outer propellant. Inner propellant shows a significant decrease for two of the older motors (figures 169 thru 172 and 177 thru 180). Motor 0022583 propellant however shows a hardening trend.

K. SWELL RATIO, GEL FRACTION AND MOISTURE:

For motor 0022687, swell ratio on insulation shows a slight increase and gel fraction shows a slight decrease from 1982 testing. On the other hand, liner shows a decrease and gel fraction an increase over 1982 values.

The moisture in the insulation was higher. The 1983 specimens were obtained from section 4.

Mean values for these tests are given in Table 7.

L. AVCOAT PROPERTIES:

A Shore D hardness test was run on Avcoat material removed from constant load specimens before bonding. A hardness of 59 corresponds, in general, to the hardness obtained on tensile specimens of Avcoat in the component program. Hardness in the 1982 report was for Avcoat plus case.

Shear strength of Avcoat under pressure is somewhat lower than in 1982 (Table 8).

Both shear and tensile strength of composite were lower than in 1982 testing (Table 8).

M. CONSTANT LOAD:

For motor 0022687 the constant load tensile and constant load shear also show lower values than in 1982. Values are given for three time points instead of just 100 minutes. Data for these tests is determined from log stress versus log time to failure. Failure modes differ, usually propellant to liner in the tensile mode. Shear tests showed cohesive failure in the propellant.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS:

For motor 0022687, an examination of mean values shows significant changes during the 1983 testing. The significance of trends however, cannot be determined from two data points. The relationship of motor 0022687 to other motors in the dissected program is not clear-cut. Although there seems to be a pattern for some parameters, it is not consistent for all tests. This is shown in the multi-motor regressions.

The individual motor regressions have shown significant trends. Thus far, none of these are approaching failure limits.

RECOMMENDATIONS:

Testing on motor 0022687 should be continued in order to determine trends and their significance.

It would be advantageous to place more emphasis on consistency of test parameters in order to obtain sufficient data for regressions, i.e., minithin testing and hydrostatic testing of bi-propellant.

TABLE 1

SIGNIFICANCE OF VARIANCE AND MEAN
('F' Test and 't' Test)
Comparison of Motor 0022687 Tested in 1982 & 1983

Test	Sample Nr/Grp	Max Stress	Strain at Max Stress	Strain at Rupture	Stress at Rupture	Modulus
Tensile, Very Low Rate, 0.0002 in/min, Outer	6	NS	Vari	Mean	NS	Mean
Inner	8	NS	Vari	Vari	Vari	Vari
Tensile, Low Rate, 2.0 in/min, Outer	6	Mean	Vari	Vari	Mean	Mean
Inner	7	Mean	Mean	Vari	Mean	Vari
Tensile, Biaxial Low Rate, 0.2 in/min, Outer	6	Mean	Mean	Mean	NS	Mean
Inner	6	Vari	NS	NS	Vari	NS
Tensile, HR Hydro, 1750 in/min, 500 psi, Outer	6	NS	NS	NS	NS	Mean
Inner	6	Vari	Mean	Mean	Vari	Mean
Tensile, Very Low Rate, 0.0002 in/min, Bi-prop	7	Mean	Mean	Mean	NS	NS
Tensile, High Rate, 1750 in/min, 500 psi. Biprop	7	Vari	NS	Mean	Vari	Mean
Tensile, Very Low Rate, 0.0002 in/min, Circumfer Inner	5	Mean	Mean	Mean	Mean	Mean
2.0 in/min Inner	5	Mean	Mean	Mean	Mean	Vari
Tensile, Minithin, 1.0 in/min, Inner	28	Mean	NS	NS	Mean	Vari
		10 sec	50 sec	100 sec	1000 sec	
Stress Relaxation, 3% Strain, Outer, -40°F	3	Mean	Mean	Mean	Vari	
20°F	3	Mean	Vari	Mean	NS	
77°F	3	NS	NS	NS	NS	
120°F	3	Mean	Mean	Mean	Vari	
160°F	3	Mean	Mean	Mean	NS	
Inner, -40°F	3	Mean	Mean	NS	Mean	
20°F	3	NS	NS	NS	NS	
77°F	3	Vari	Vari	Vari	Vari	
120°F	3	Mean	Mean	Mean	Mean	
160°F	3	Vari	Vari	Vari	Mean	

TABLE 1 (cont)

Test	Nr/Grp	10 sec	50 sec	100 sec	1000 sec
Stress Relaxation, 5% Strain, Outer, -40°F	3	Vari	Vari	Vari	Mean
20°F	3	NS	Mean	Vari	Vari
77°F	3	NS	NS	NS	NS
120°F	3	Mean	Mean	Mean	Vari
160°F	3	Mean	Vari	Vari	Mean
Inner, -40°F	3	Mean	Mean	Mean	Mean
20°F	3	Vari	Vari	Vari	Vari
77°F	3	Vari	Vari	Vari	Vari
120°F	3	Vari	Vari	Vari	Vari
160°F	3	Vari	Vari	Vari	Vari
Hardness, Shore A, 10 sec, Outer	10	Vari			
Inner	10	Vari			
TCLE, Below Tg, Outer	3	NS			
Above Tg, Outer	3	NS			
Below Tg, Inner	3	NS			
Above Tg, Inner	3	NS			
Burn Rate, 500 psi, Outer	6	Mean			
Inner	6	Vari			

NS = Non-significant
Vari = Differences found among data variances
Mean = Differences found among data means

TABLE 2

ANALYSIS OF COVARIANCE SUMMARY
Comparison of Regressions Between 0022135, 0022583 & 0022788

Test	Nr Samples	Residual Mean Squares 0022135	0022583	0022788	Difference Between Residual Trend Lines Variance	Slope	Elevation
Tensile, Very Low Rate, 0.0002 in/min,							
Outer, Maximum Stress, 77°F	108	10.522	32.998	15.530	S	-	-
" Strain at Rupture, 77°F	108	0.0005906	0.0005166	0.0009886	NS	S	S
" Modulus, 77°F	108	3568.1	2470.6	3743.8	NS	NS	S
Inner, Maximum Stress, 77°F	151	34.750	25.790	20.678	NS	S	S
" Strain at Rupture, 77°F	154	0.0010087	0.0008333	0.0021539	S	-	-
" Modulus, 77°F	154	2253.2	1422.5	1396.4	NS	S	S
Tensile, High Rate Hydro, 1750 in/min, 500 psi							
Outer, Maximum Stress, 77°F	89	1036.6	4207.7	33497.0	S	-	-
" Strain at Rupture, 77°F	89	0.0021534	0.0022428	0.022861	S	-	-
" Modulus, 77°F	89	302350.0	1422.5	1396.4	S	-	-
Inner, Maximum Stress, 77°F	97	10081.0	3190.1	3108.9	S	-	-
" Strain at Rupture, 77°F	97	0.0023537	0.0042473	0.0054679	S	-	-
" Modulus, 77°F	97	97433.0	568620.0	1112200.0	NS	-	-
Tensile, Bi-propellant, 0.0002 in/min, 77°F							
Maximum Stress	48	9.5555	N/A	15.220	NS	S	S
Strain at Rupture	49	0.00016923	N/A	0.00076906	S	-	-
Modulus	49	834.70	N/A	2248.0	S	-	-
Tensile, Circumferential, 0.0002 in/min, 77°F							
Inner, Maximum Stress	36		N/A	2.6135	NS	NS	S
" Strain at Rupture	36	0.0007419	N/A	0.0019289	S	-	-
" Modulus	36	379.51	N/A	2894.3	S	-	-
Hardness, Shore A, 77°F							
Outer, Initial	200	4.2373	3.8086	8.6533	S	-	-
Inner, Initial	208	4.4194	9.7621	40.281	S	-	-
Outer, 10 sec	200	6.3445	3.5362	2.6123	S	-	-
Inner, 10 sec	208	4.6620	14.247	7.4148	S	-	-

S = Data are significantly different
NS = Data not significant
N/A = Only three test periods
- = No further Covariance testing needed

TABLE 3

REGRESSION SUMMARY

Test	Motor S/N	Sample Nr/Grp	OUTER Sm	OUTER er	OUTER E	Sample Nr/Grp	INNER Sm	INNER er	INNER E
Tensile, Very Low Rate, 0.0002 in/min	Composite	118/20	NS	S+	NS	169/23	NS	NS	NS
	0022135	36/6	S-	NS	NS	60/9	NS	NS	S-
	0022583	30/4	NS	S-	NS	36/4	S+	NS	NS
	0022788	42/7	NS	S+	S-	58/7	NS	NS	NS
	0022687	10/2	X	X	X	15/2	X	X	X
Tensile, Low Rate, 2.0 in/min	Composite	126/22	S+	S-	NS	152/20	NS	S+	NS
	0022135	41/8	S+	NS	NS	47/6	S-	S+	S-
	0022583	32/5	S+	NS	S+	39/5	S+	S+	S+
	0022788	41/7	NS	S+	S-	46/7	S-	S-	NS
	0022687	12/2	X	X	X	20/2	X	X	X
Tensile, Biaxial, 0.2 in/min	Composite	86/19	NS	S+	S-	96/21	NS	S+	NS
	0022135	31/7	S-	NS	S-	30/7	S-	S+	S-
	0022583	22/4	S-	S+	S-	22/5	NS	NS	NS
	0022788	29/7	NS	S+	S-	32/7	NS	NS	S-
	0022687	4/2	X	X	X	12/2	X	X	X
Tensile, High Rate Hydro, 1750 in/min	Composite	101/19	S+	NS	S+	109/20	S+	NS	S+
	0022135	28/6	S+	NS	S+	38/7	NS	NS	S+
	0022583	21/4	S+	NS	S+	24/4	S+	NS	S+
	0022788	40/7	S+	NS	S+	35/7	S+	NS	S+
	0022687	12/2	X	X	X	12/2	X	X	X
Tensile, Very Low Rate, 0.0002 in/min Circumferential	Composite	NA/NA	NA	NA	NA	55/16	S+	NS	NS
	0022135	NA/NA	NA	NA	NA	19/6	NS	NS	S-
	0022583	NA/NA	NA	NA	NA	10/3	X	X	X
	0022788	NA/NA	NA	NA	NA	17/5	NS	NS	NS
	0022687	NA/NA	NA	NA	NA	9/2	X	X	X
Tensile, Low Rate, 2.0 in/min, Circumferential	Composite	NA/NA	NA	NA	NA	33/7	NS	S+	NS
	0022135	NA/NA	NA	NA	NA	9/2	X	X	X
	0022583	NA/NA	NA	NA	NA	7/1	X	X	X
	0022788	NA/NA	NA	NA	NA	9/2	X	X	X
	0022687	NA/NA	NA	NA	NA	8/2	X	X	X

TABLE 3 (cont)

Test	Motor S/N	Sample Nr/Grp	OUTER Sm	OUTER er	OUTER E	Sample Nr/Grp	INNER Sm	INNER er	INNER E
Tensile, Minithins, 1.0 in/min	Composite	97/3	S-	NS	S-	131/4	S+	NS	S+
	0022135	44/1	X	X	X	35/1	X	X	X
	0022583	X	X	X	X	X	X	X	X
	0022788	35/1	X	X	X	42/1	X	X	X
	0022687	18/1	X	X	X	54/2	X	X	X
Tensile, Very Low Rate, (ANC) Bi-prop 0.0002 in/min	Composite	75/18	S-	NS	S-				
	0022135	25/7	S-	NS	S-				
	0022583	13/3	X	X	X				
	0022788	23/6	NS	NS	NS				
	0022687	14/2	X	X	X				
Tensile, High Rate, 1750 in/min, 500 psi, ANC	Composite	25/4	NS	NS	S-				
	0022135	6/1	X	X	X				
	0022583	X	X	X					
	0022788	6/1	X	X	X				
	0022687	13/2	X	X	X				

			In Seconds					In Seconds			
			10	50	100	1000		10	50	100	1000
Stress Relaxation, 3% Strain, -40°F	Composite	18/6	NS	NS	NS	NS	19/7	NS	NS	NS	NS
20°F	Composite	24/8	NS	NS	NS	NS	24/8	S+	NS	NS	NS
77°F	Composite	71/11	S-	S-	S-	S-	72/11	NS	NS	NS	NS
120°F	Composite	12/4	S-	S-	S-	S-	12/4	NS	NS	NS	NS
Stress Relaxation, 5% Strain, -40°F	Composite	9/3	S+	S+	S+	S+	9/3	S+	S+	S+	S+
20°F	Composite	12/4	NS	NS	NS	NS	12/4	NS	NS	NS	NS
77°F	Composite	60/7	S-	S-	S-	S-	60/7	NS	NS	NS	NS
120°F	Composite	12/4	S+	S+	S+	S+	12/4	NS	NS	NS	NS
Burn Rate, 500 psi, in/sec	Composite	78/16 (S+)					102/21 (S+)				
	0022135	23/5 (S+)					32/7 (S+)				
	0022583	17/3 X					26/5 (S+)				
	0022788	26/6 (NS)					32/7 (NS)				
	0022687	12/2 X					12/2 X				

TABLE 3 (cont)

Test	Motor S/N	Sample Nr/Grp	OUTER	Sample Nr/Grp	INNER
TCLE, Below Glass Point	Composite	76/20	NS	76/20	S+
	0022135	26/7	S+	27/7	NS
	0022583	17/4	NS	17/4	NS
	0022788	26/7	NS	26/7	S+
	0022687	7/2	X	6/2	X
TCLE, Above Glass Point	Composite	76/20	S+	76/20	S+
	0022135	26/7	S+	27/7	NS
	0022583	17/4	S+	17/4	NS
	0022788	26/7	S+	26/7	S+
	0022687	7/2	X	6/2	X
Hardness, Initial Reading	Composite	221/19	S-	241/19	S-
	0022135	75/7	S-	75/7	S-
	0022583	50/4	NS	58/4	S+
	0022788	75/7	S-	75/7	S-
	0022687	21/2	X	33/2	X
Hardness, 10 sec Reading	Composite	220/20	S-	241/20	S+
	0022135	75/7	NS	75/7	S-
	0022583	50/4	S-	58/4	S+
	0022788	75/4	S-	75/7	NS
	0022687	20/2	X	33/2	X

NS = Non-significant Difference
S+ = Significant difference in trend line slope in the positive direction
S- = Significan difference in trend line slope in the negative direction
X = Not sufficient data for regressions

TABLE 4

Bi-Propellant Tensile Test Data
1982 - 1983 Mean Values
Motor S/N 0022687

Test	CHS (in/min)	Year	Sm (psi)	em (in/min)	er (in/min)	Sr (psi)	E (psi)
Hydrostatic Tensile,	1750	1982	526.6	.380	.453	515.8	6323
at 500 psi		1983	519.3	.395	.477	504.2	4578
Uniaxial Tensile	.0002	1982	37.2	.217	.237	35.4	232
		1983	39.9	.229	.260	36.8	225

TABLE 5

Tensile Test Parameters
1982 - 1983 Mean Values

OUTER

Test	CHS (in/min)	Year	Sm (psi)	em (in/min)	er (in/min)	Sr (psi)	E (psi)
Uniaxial Tensile	0.0002	1982	45.7	.194	.235	42.3	338
		1983	47.6	.224	.258	43.5	290
	2.0	1982	129.9	.388	.592	108.8	944
		1983	112.1	.376	.627	92.0	737
Biaxial Tensile	0.2	1982	104.3	.316	.416	95.5	696
		1983	110.0	.354	.452	99.9	761
Hydrostatic Tensile	1750	1982	557.4	.333	.419	541.6	6887
	at 500 psi	1983	560.6	.340	.432	542.7	5650
Minithin Tensile	1.0	1983	94.1	.446	.637	79.7	522

INNER

Uniaxial Tensile	0.0002	1982	48.6	.356	.407	46.1	185
		1983	47.9	.272	.329	44.1	244
	2.0	1982	123.1	.549	.730	111.4	644
		1983	116.5	.423	.712	96.7	751
Biaxial Tensile	0.2	1982	118.1	.447	.529	113.3	447
		1983	114.2	.460	.566	108.8	470
Hydrostatic Tensile	1750	1982	606.1	.507	.665	583.8	5445
	at 500 psi	1983	591.2	.572	.748	559.2	4037
Circumferential Tensile	0.0002	1982	49.8	.374	.402	48.3	185
		1983	55.5	.334	.368	52.6	22.
	2.0	1982	121.0	.429	.537	111.3	658
		1983	141.7	.596	.657	135.4	638
Minithin Tensile	1.0	1982	118.5	.737	.833	113.0	653
		1983	125.6	.743	.832	120.7	446

TABLE 6
Stress Relaxation
1982 - 1983 Mean Values

OUTER

Strain Rate	Temp (°F)	Year Tested	10 sec (psi)	50 sec (psi)	100 sec (psi)	1000 sec (psi)
3%	-40	1982	12,518	7300	5859	2601
		1983	13,784	8176	6403	3007
	+20	1982	1635	958	793	444
		1983	1959	1058	866	4.8
	+77	1982	506	352	318	242
		1983	467	340	301	229
	120	1982	399	322	300	245
		1983	313	246	233	168
	160	1982	275	229	214	165
		1983	337	269	248	184
5%	-40	1982	6571	3743	2951	1219
		1983	8512	4564	3583	1663
	20	1982	1595	887	72.7	395
		1983	1629	798	614	303
	77	1982	563	399	.357	280
		1983	546	369	338	264
	120	1982	323	259	241	195
		1983	418	323	300	238
	160	1982	304	250	234	179
		1983	275	223	206	143

INNER

Strain Rate	Temp (°F)	Year Tested	10 sec (psi)	50 sec (psi)	100 sec (psi)	1000 sec (psi)
3%	-40	1982	15443	9071	7282	3117
		1983	17436	10422	8137	3911
	20	1982	1470	791	622	342
		1983	1567	817	661	273
	77	1982	529	380	340	253
		1983	402	289	261	185

INNER (CONT)

Strain Rate	Temp (°F)	Year Tested	10 sec (psi)	50 sec (psi)	100 sec (psi)	1000 sec (psi)
3%(cont)	120	1982	399	297	279	220
		1983	302	231	220	174
	160	1982	294	253	238	190
		1983	268	214	201	162
5%	-40	1982	9356	6556	6321	1854
		1983	11998	6590	5251	2552
	20	1982	1403	781	631	321
		1983	1514	783	561	253
	77	1982	528	373	334	250
		1983	434	295	261	207
	120	1982	370	295	273	217
		1983	334	254	234	193
	160	1982	323	279	264	219
		1983	279	228	210	171

TABLE 7
Miscellaneous Properties

Test	1982 $\bar{x}$	1983 $\bar{x}$
Burn Rate		
Outer Prop	.297	.304
Inner Prop	.358	.373
TCLE (in/in x $10^{-5°C}$)		
Outer Prop Above Tg	10.50	10.0
Tg	-56	-59
Below Tg	6.29	5.71
Inner Prop Above Tg	9.82	9.89
Tg	-58	-57
Below Tg	6.44	5.92
Hardness		
Outer Initial	77	75.8
10 sec	69	63.3
Inner Initial	74	76.7
10 sec	62	65.0
Swell Ratio		
Insulation	1.47	1.58
Liner	2.42	2.07
Gel Fraction		
Insulation	89.69	87.59
Liner	63.33	67.52
Moisture (%)		
Insulation	0.92	1.57

TABLE 8

AVCOAT Properties

Test Conditions	1982 $\bar{X}$	1983 $\bar{X}$
Hardness, Shore D	83*	59
Shear Strength, Avcoat (psi) 2.0 in/min, 500 psi	1161	1016
Shear Strength, Composite (psi) 2.0 in/min, 500 psi	171	153.2
Tensile Strength, Composite (psi) 20 in/min, 500 psi	508	419.5
Constant Load Tensile (Log stress (psi) vs log time to fail/min)	@ 100 min 37.8	@ 1 min 79.73 @ 10 min 51.23 @ 100 min 32.9
Constant Load Shear (Log stress (psi) vs log time to fail/min)		@ 1 min 40.54 @ 10 min 30.96 @ 100 min 23.65

* This represents hardness of Avcoat on titanium. All hardness on Avcoat in the dissect motor program was obtained this way, except for the 1983 data, which is on Avcoat alone.

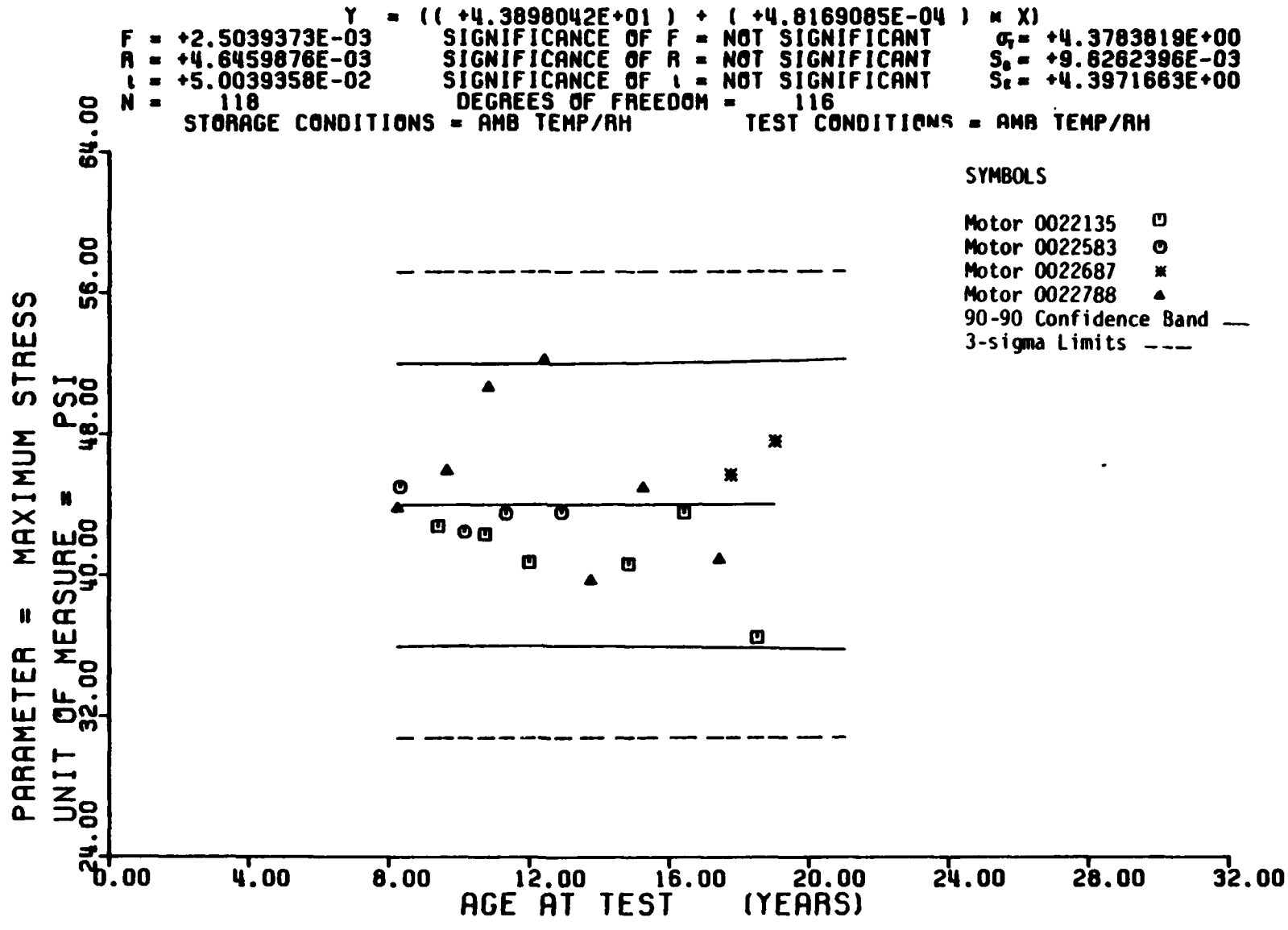

Y = ((+4.3898042E+01) + (+4.8169085E-04) * X)
F = +2.5039373E-03 SIGNIFICANCE OF F = NOT SIGNIFICANT σt= +4.3783819E+00
R = +4.6459876E-03 SIGNIFICANCE OF R = NOT SIGNIFICANT Se= +9.6262396E-03
t = +5.0039358E-02 SIGNIFICANCE OF t = NOT SIGNIFICANT St= +4.3971663E+00
N = 118 DEGREES OF FREEDOM = 116
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
64.00
56.00
48.00
40.00
32.00
24.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS,OUTER,AXIAL POS,V.L.RATE CHS=0.0002 IN/MIN,MAXIMUM STRESS

Figure 5

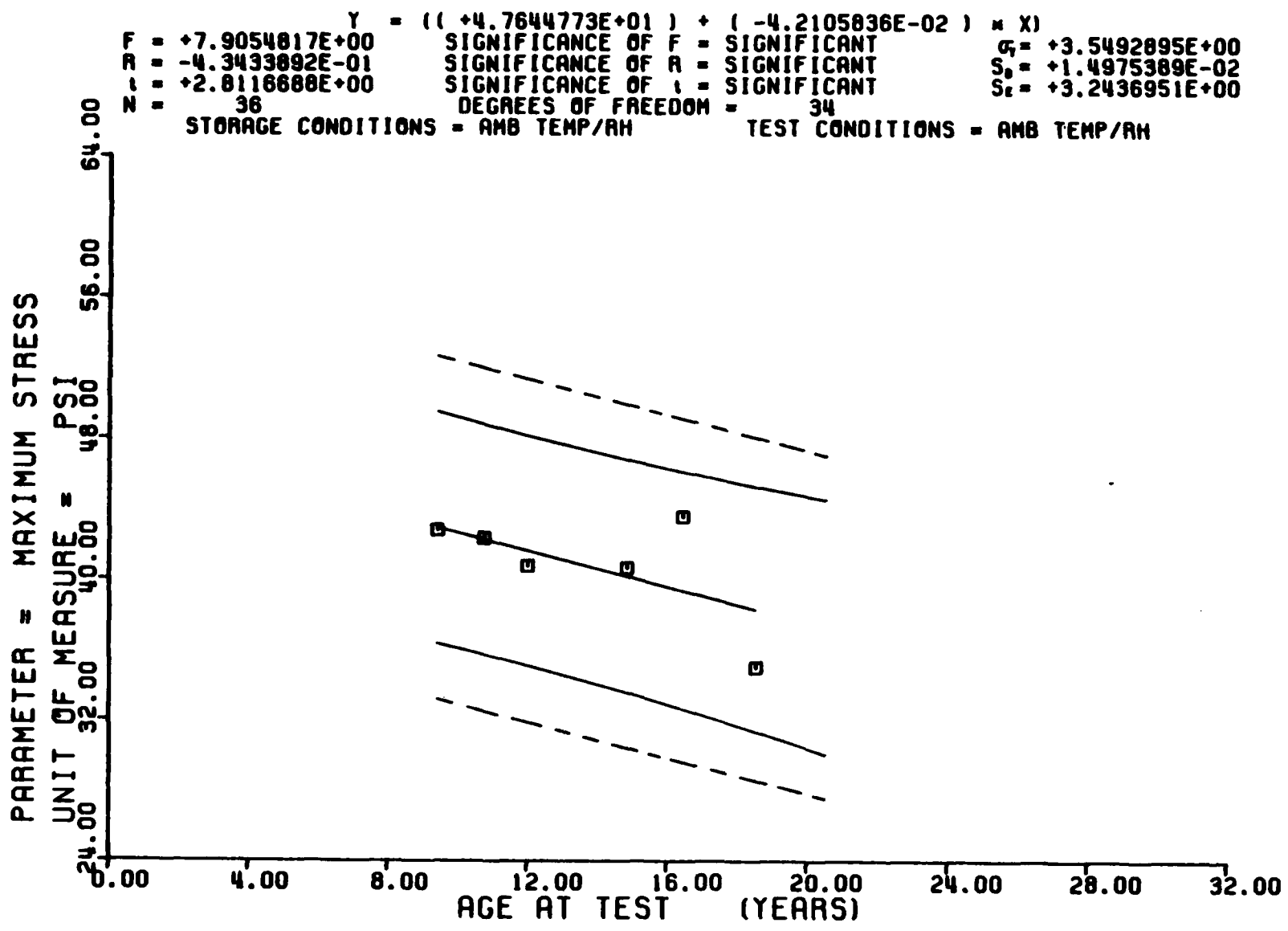

Y = ((+4.7644773E+01) + (-4.2105836E-02) * X)
F = +7.9054817E+00 SIGNIFICANCE OF F = SIGNIFICANT σ1 = +3.5492895E+00
R = -4.3433892E-01 SIGNIFICANCE OF R = SIGNIFICANT S0 = +1.4975389E-02
t = +2.8116688E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +3.2436951E+00
N = 36 DEGREES OF FREEDOM = 34
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
64.00
56.00
48.00
40.00
32.00
24.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS,OUTER,AXIAL POS,V.L.RATE CHS=0.0002 MAX STRESS <0022135>

Figure 6

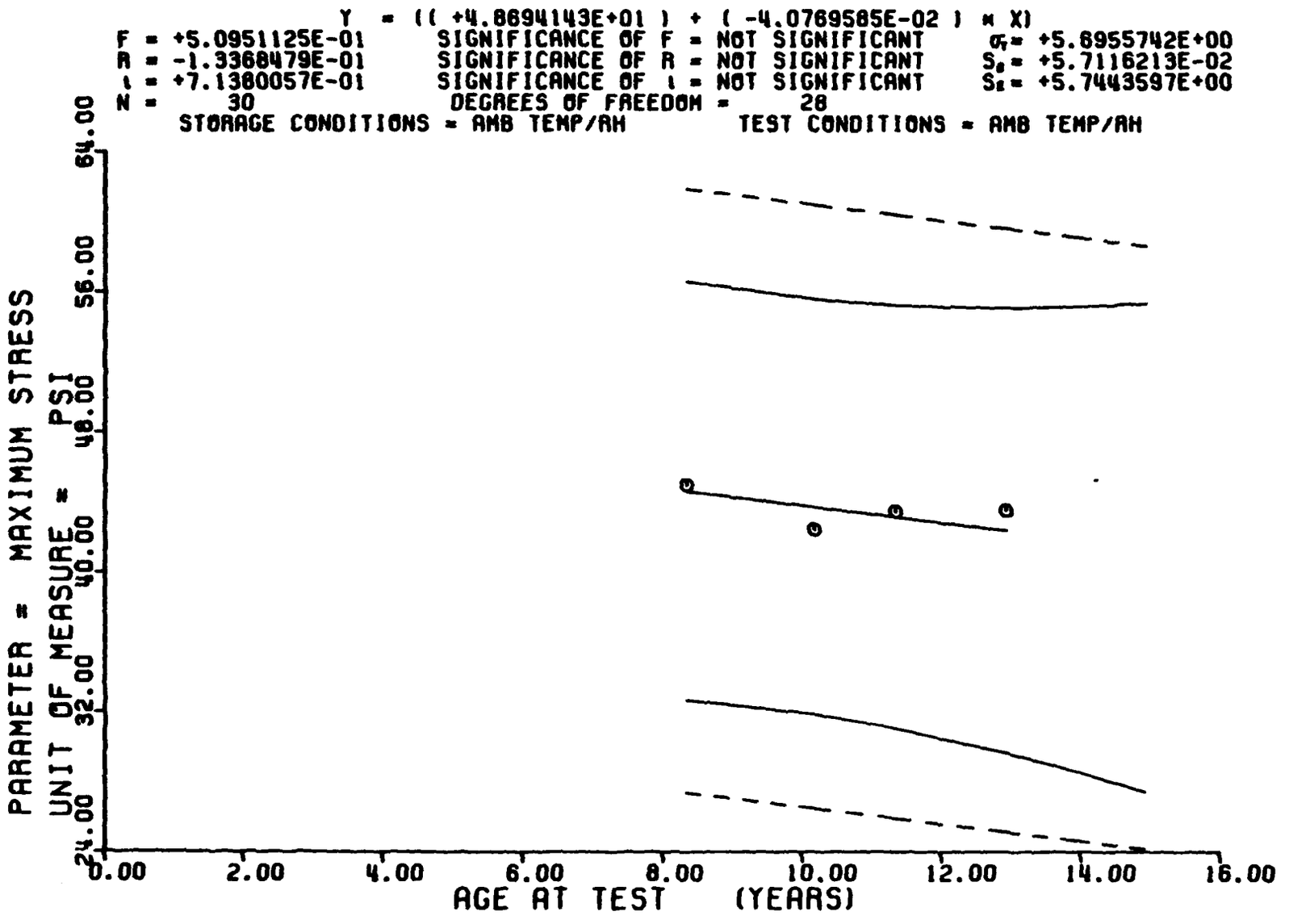

Y = ((+4.8694143E+01) + (-4.0769585E-02) * X)
F = +5.0951125E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +5.6955742E+00
R = -1.3368479E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Se = +5.7116213E-02
t = +7.1380057E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Sx = +5.7443597E+00
N = 30 DEGREES OF FREEDOM = 28
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
64.00
56.00
48.00
40.00
32.00
24.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL POS,V.L.RATE CHS=0.0002 MAX STRESS <0022583>

Figure 7

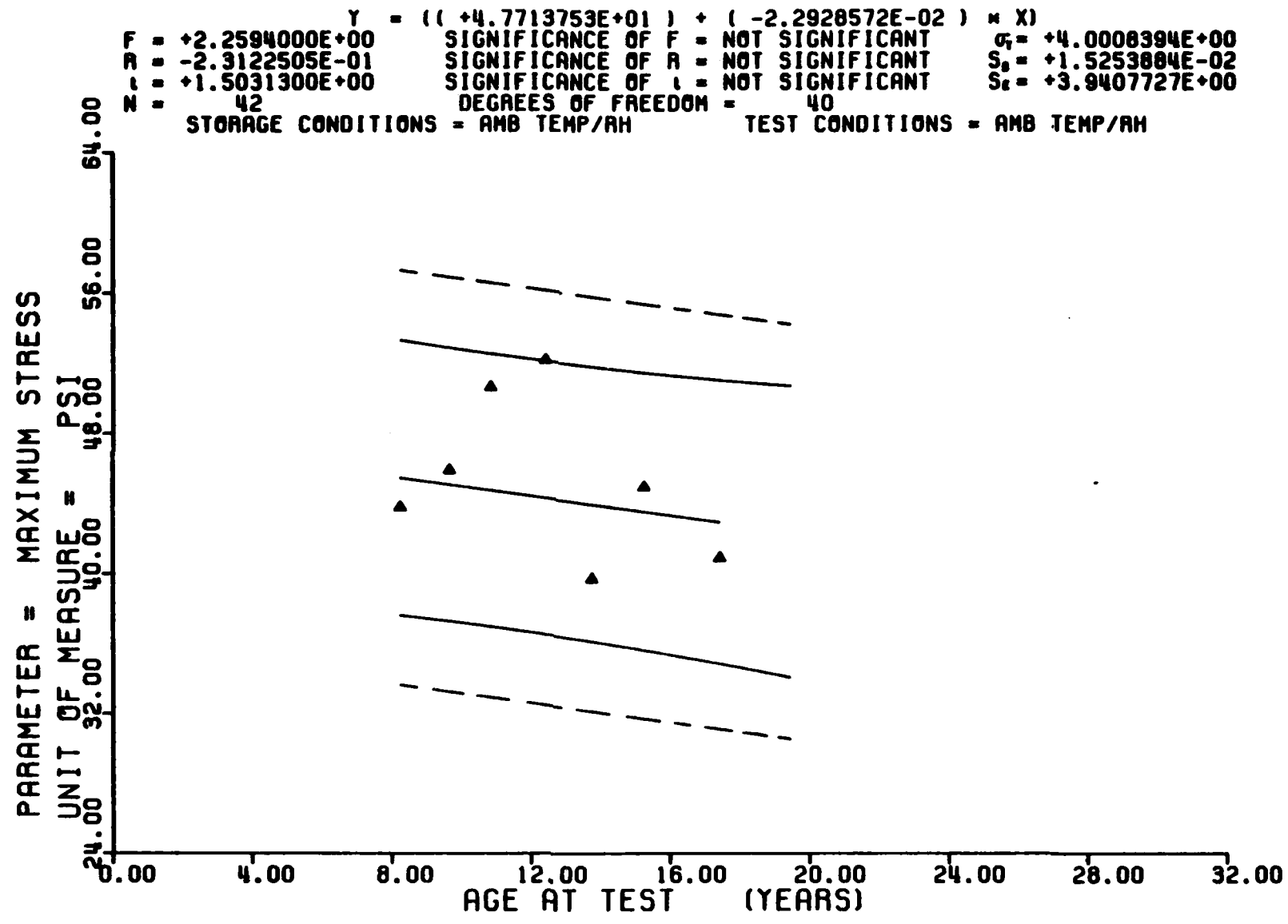

Y = ((+4.7713753E+01) + (-2.2928572E-02) * X)
F = +2.2594000E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σ1 = +4.0008394E+00
R = -2.3122505E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +1.5253884E-02
ι = +1.5031300E+00 SIGNIFICANCE OF ι = NOT SIGNIFICANT Sε = +3.9407727E+00
N = 42 DEGREES OF FREEDOM = 40
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
64.00
56.00
48.00
40.00
32.00
24.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL POS,V.L.RATE CHS=0.0002 MAX STRESS <0022788>

Figure 8

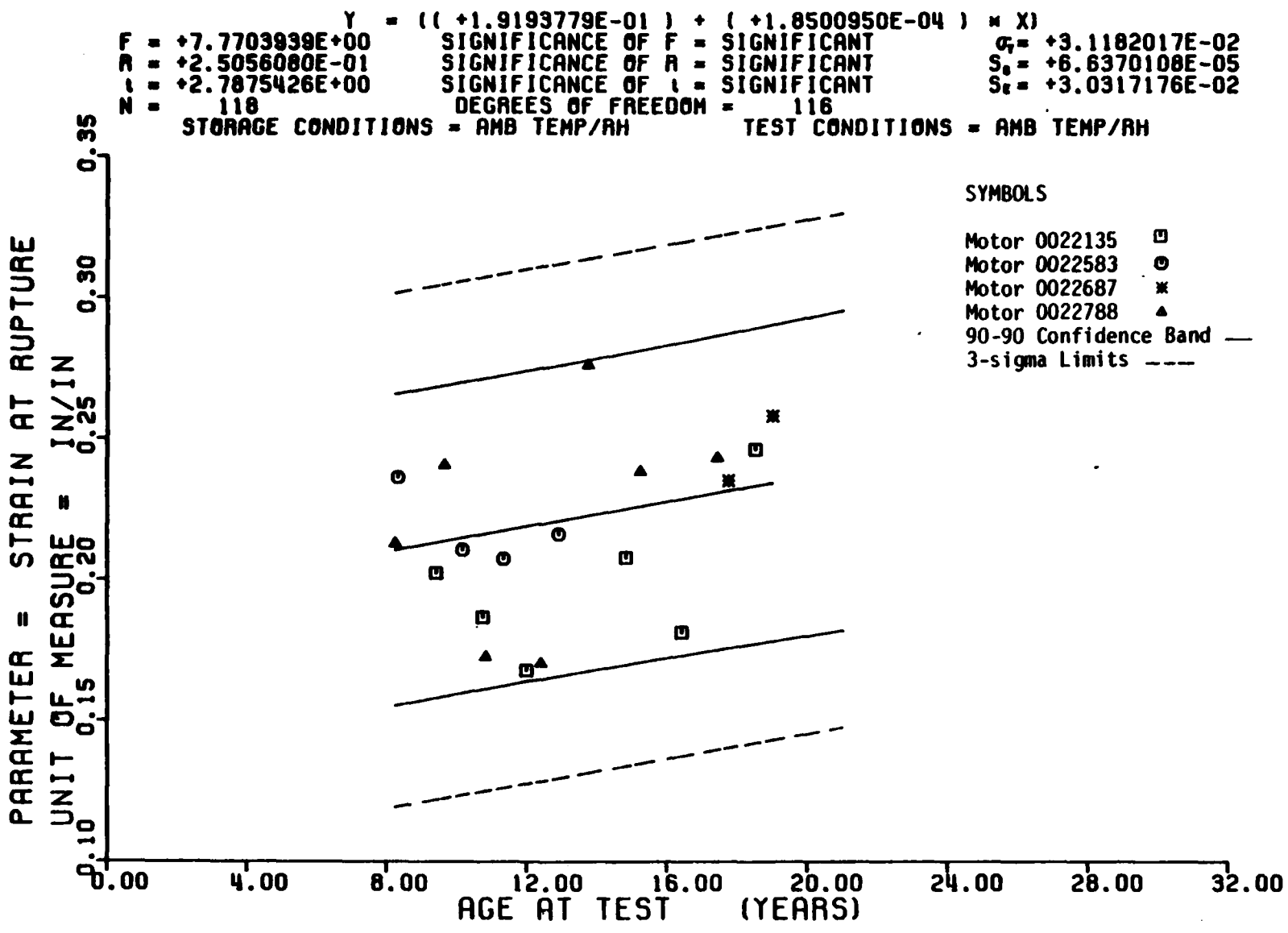

Y = ((+1.9193779E-01) + (+1.8500950E-04) * X)
F = +7.7703939E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +2.5056080E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.7875426E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 118 DEGREES OF FREEDOM = 116
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.10
0.15
0.20
0.25
0.30
0.35
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL POS,V.L.RATE CHS=0.0002 IN/MIN,STRAIN/RUPTURE

Figure 9

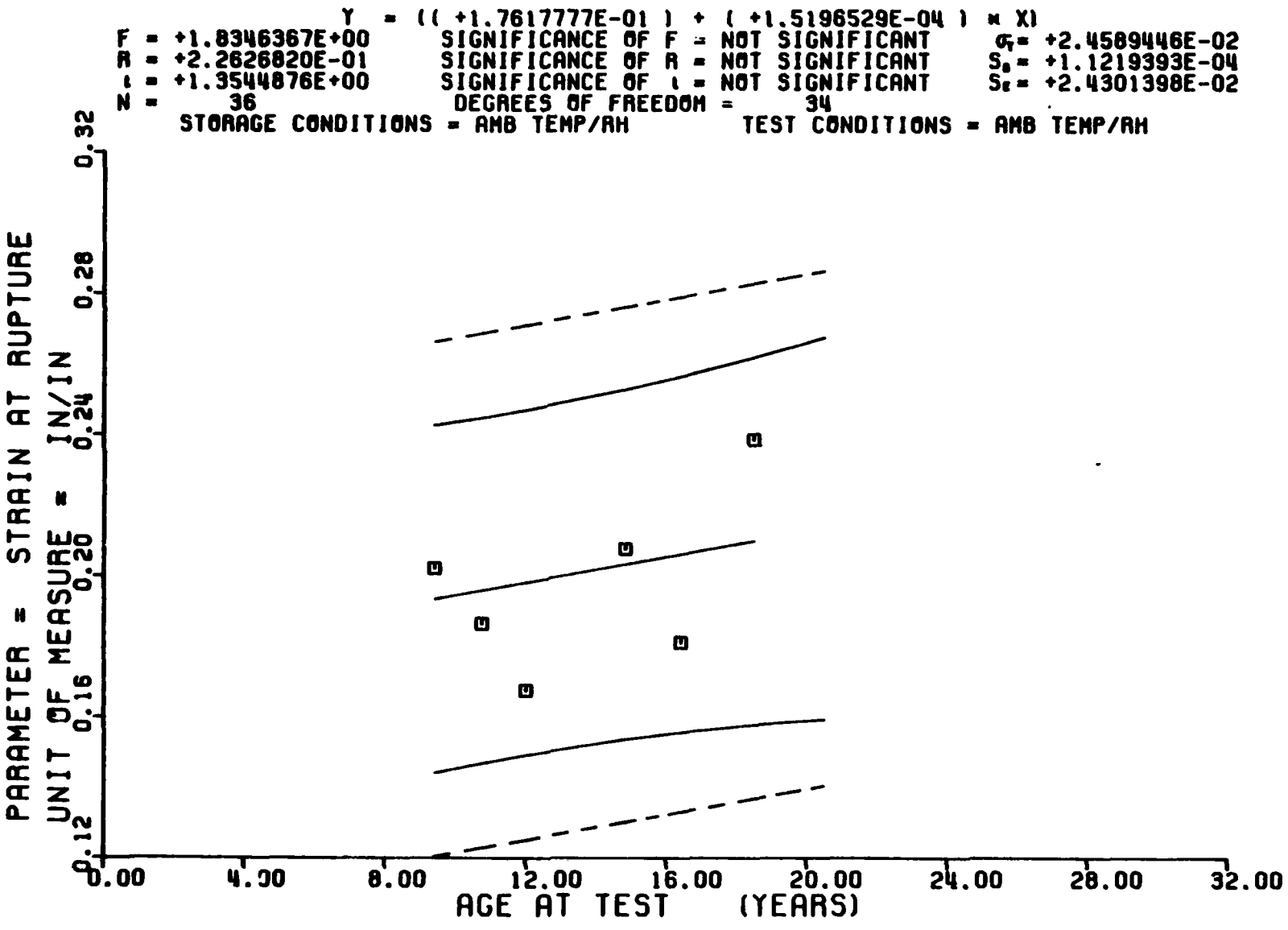

Y = ((+1.7617777E-01) + (+1.5196529E-04) * X)
F = +1.8346367E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σ = +2.4589446E-02
R = +2.2626820E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT S = +1.1219393E-04
t = +1.3544876E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT S = +2.4301398E-02
N = 36 DEGREES OF FREEDOM = 34
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.12
0.16
0.20
0.24
0.28
0.32
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR <0022135>,OUTER,AXIAL POS,V.L.RATE CHS=0.0002,STRAIN RUPTURE.

Figure 10

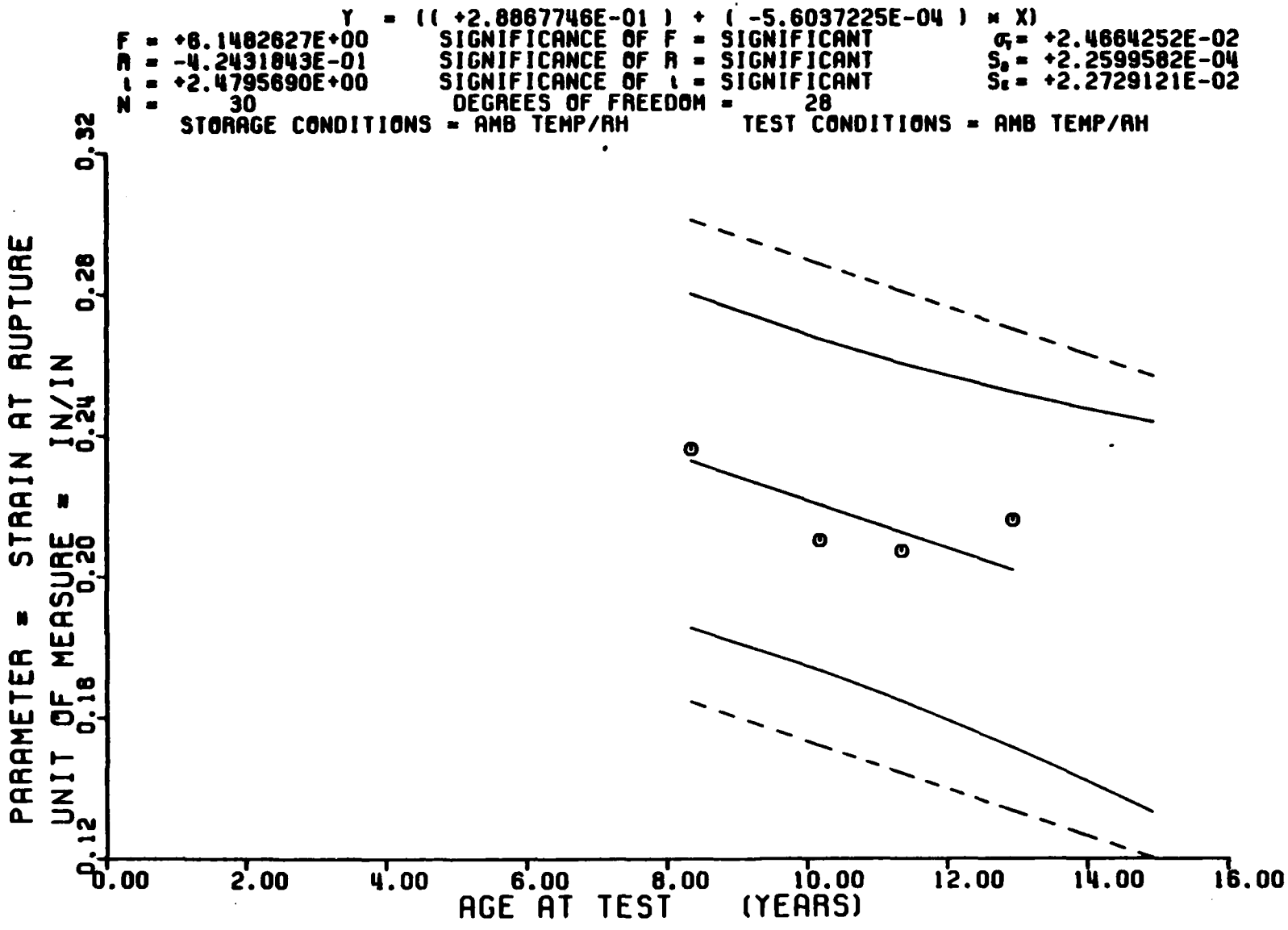

Y = ((+2.8867746E-01) + (-5.6037225E-04) x X)
F = +6.1482627E+00 SIGNIFICANCE OF F = SIGNIFICANT σr = +2.4664252E-02
R = -4.2431843E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +2.2599582E-04
i = +2.4795690E+00 SIGNIFICANCE OF i = SIGNIFICANT Se = +2.2729121E-02
N = 30 DEGREES OF FREEDOM = 28
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.32
0.28
0.24
0.20
0.18
0.12
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR <0022583>,OUTER,AXIAL POS,V.L.RATE CHS=0.0002,STRAIN RUPTURE.

Figure 11

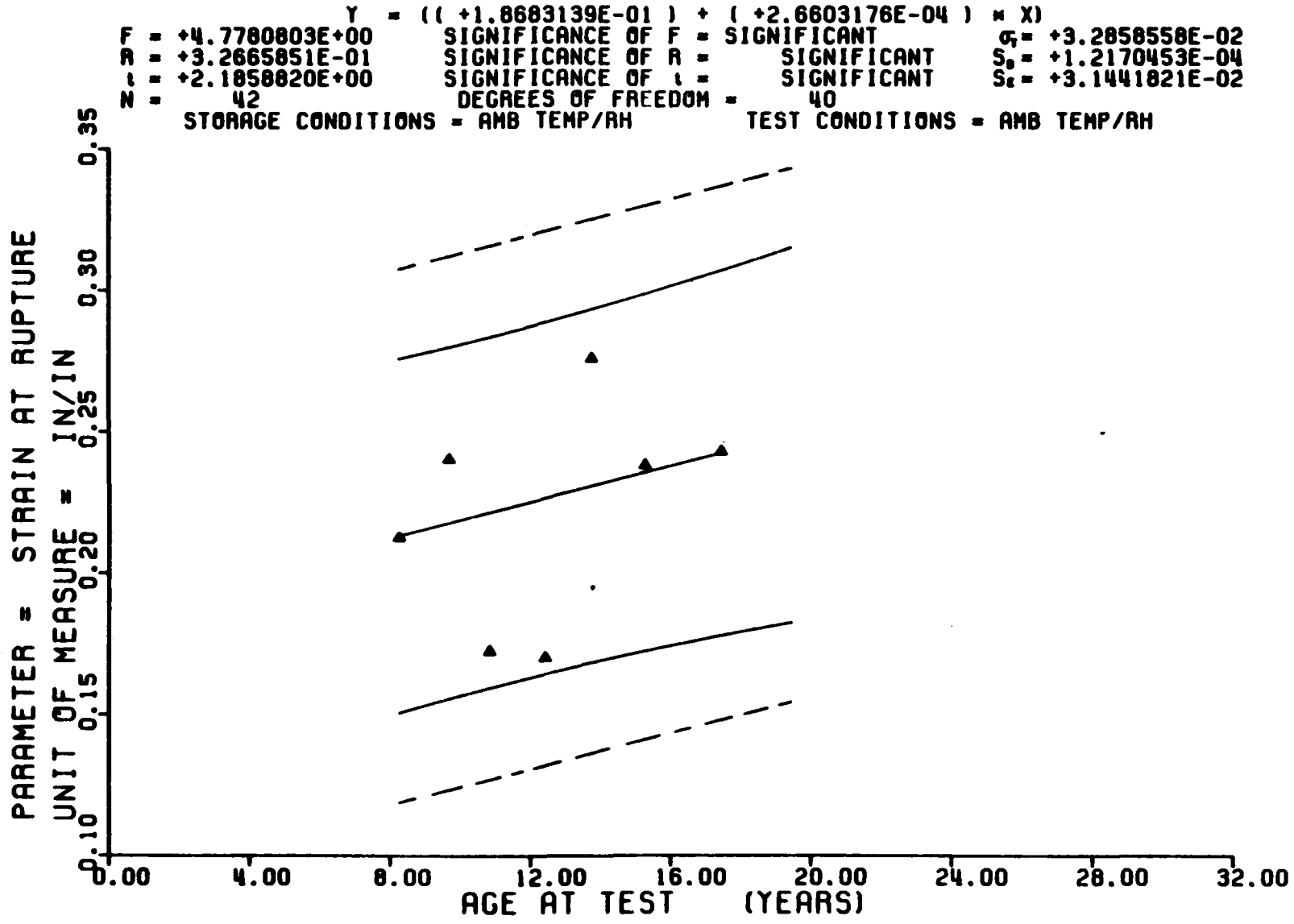

Y = ((+1.8683139E-01) + (+2.6603176E-04) * X)
F = +4.7780803E+00 SIGNIFICANCE OF F = SIGNIFICANT σ1 = +3.2858558E-02
R = +3.2665851E-01 SIGNIFICANCE OF R = SIGNIFICANT S0 = +1.2170453E-04
t = +2.1858820E+00 SIGNIFICANCE OF t = SIGNIFICANT Sx = +3.1441821E-02
N = 42 DEGREES OF FREEDOM = 40
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.10
0.15
0.20
0.25
0.30
0.35
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR <0022788>,OUTER,AXIAL POS,V.L.RATE CHS=0.0002,STRAIN RUPTURE.

Figure 12

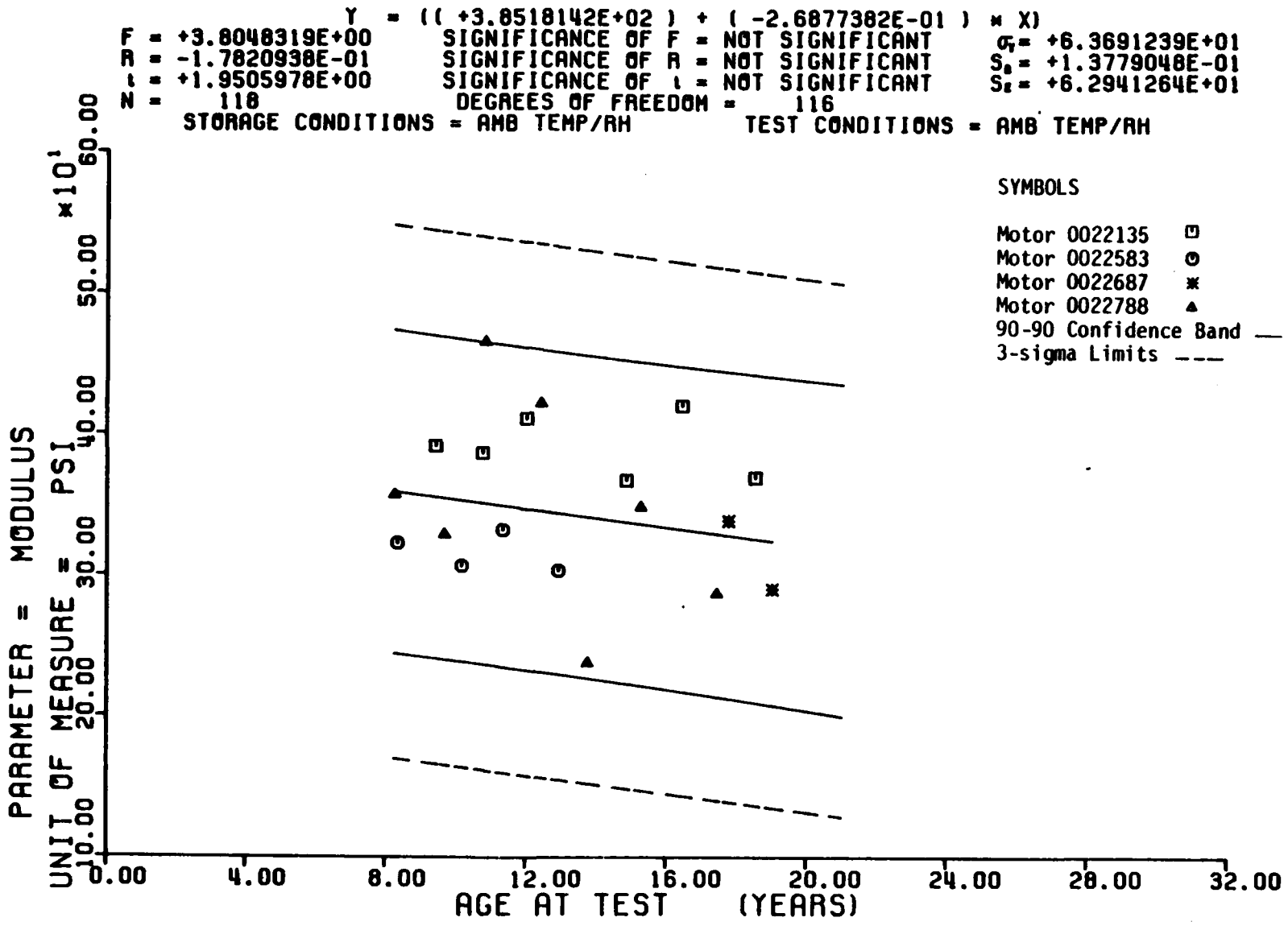
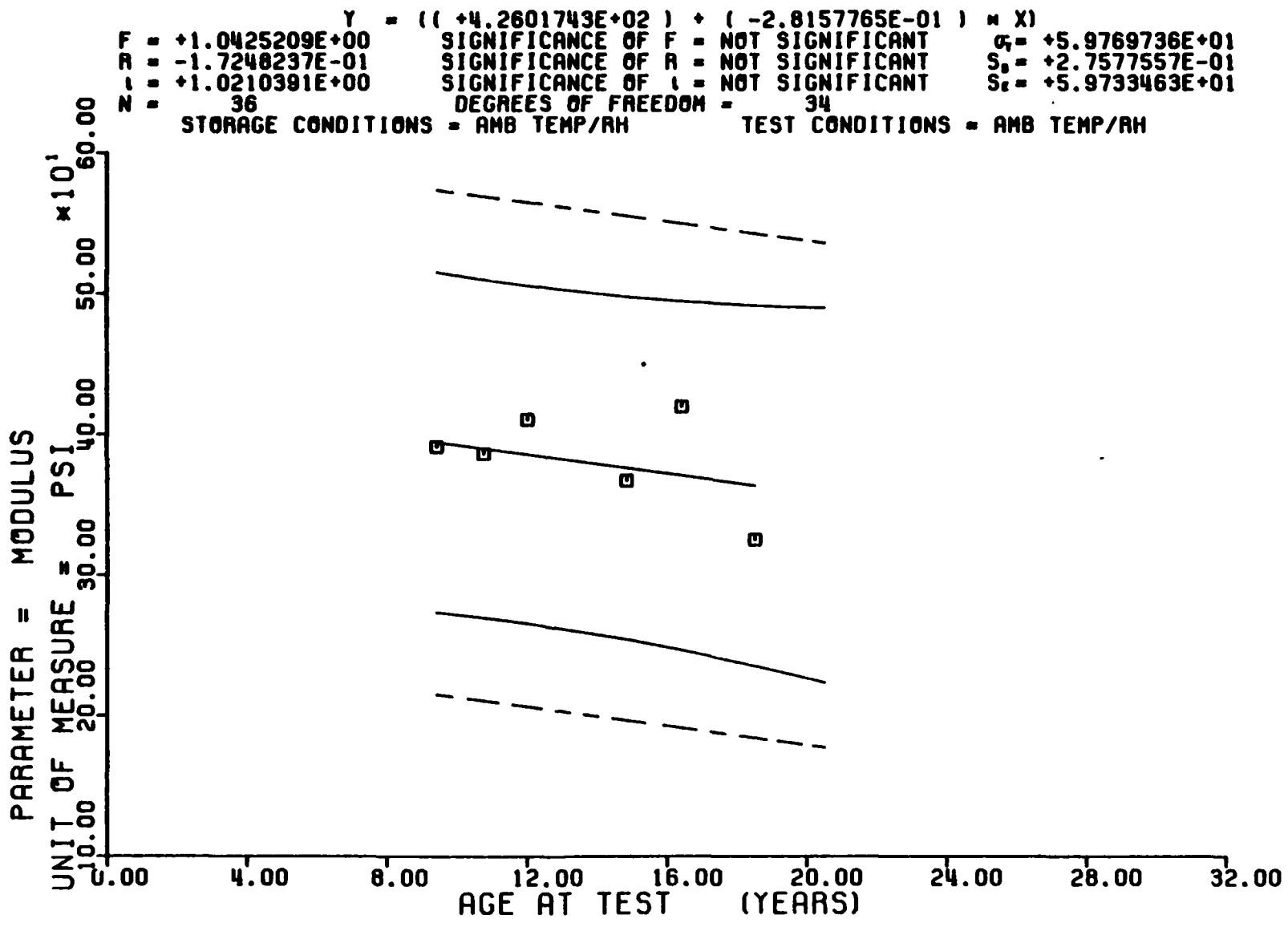
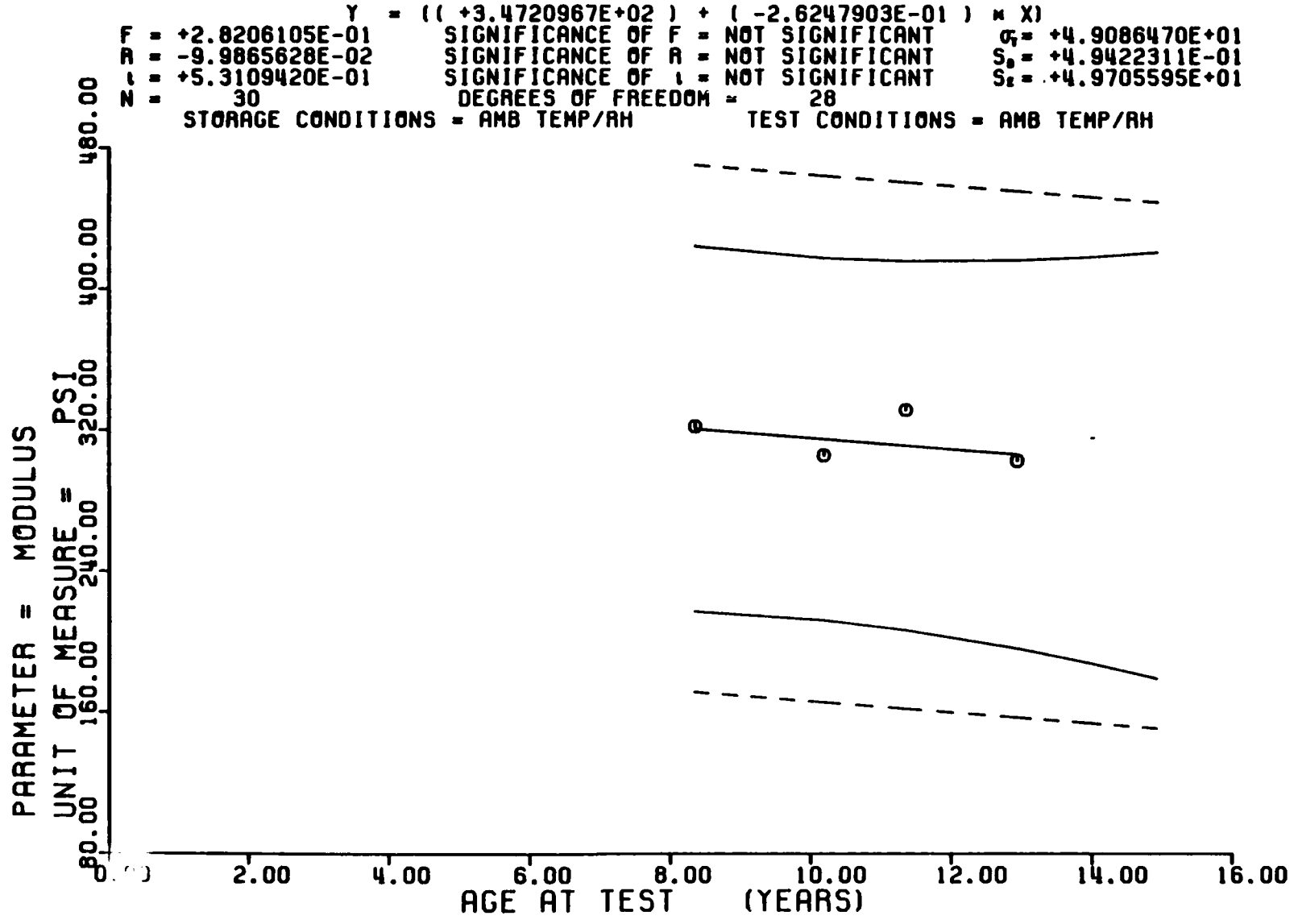

Y = ((+3.8518142E+02) + (-2.6877382E-01) * X)
F = +3.8048319E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +6.3691239E+01
R = -1.7820938E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sa = +1.3779048E-01
t = +1.9505978E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +6.2941264E+01
N = 118 DEGREES OF FREEDOM = 116
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MODULUS
UNIT OF MEASURE = PSI x10¹
10.00
20.00
30.00
40.00
50.00
60.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL POS,V.L.RATE CHS=0.0002 IN/MIN, MODULUS

Figure 13



II STAGE DSCT MTR <0022135>,OUTER,AXIAL POS,V.L.RATE CHS=0.0002, MODULUS.

Figure 14



STAGE DSCT MTR <0022583>,OUTER,AXIAL POS,V.L.RATE CHS=0.0002, MODULUS.

Figure 15

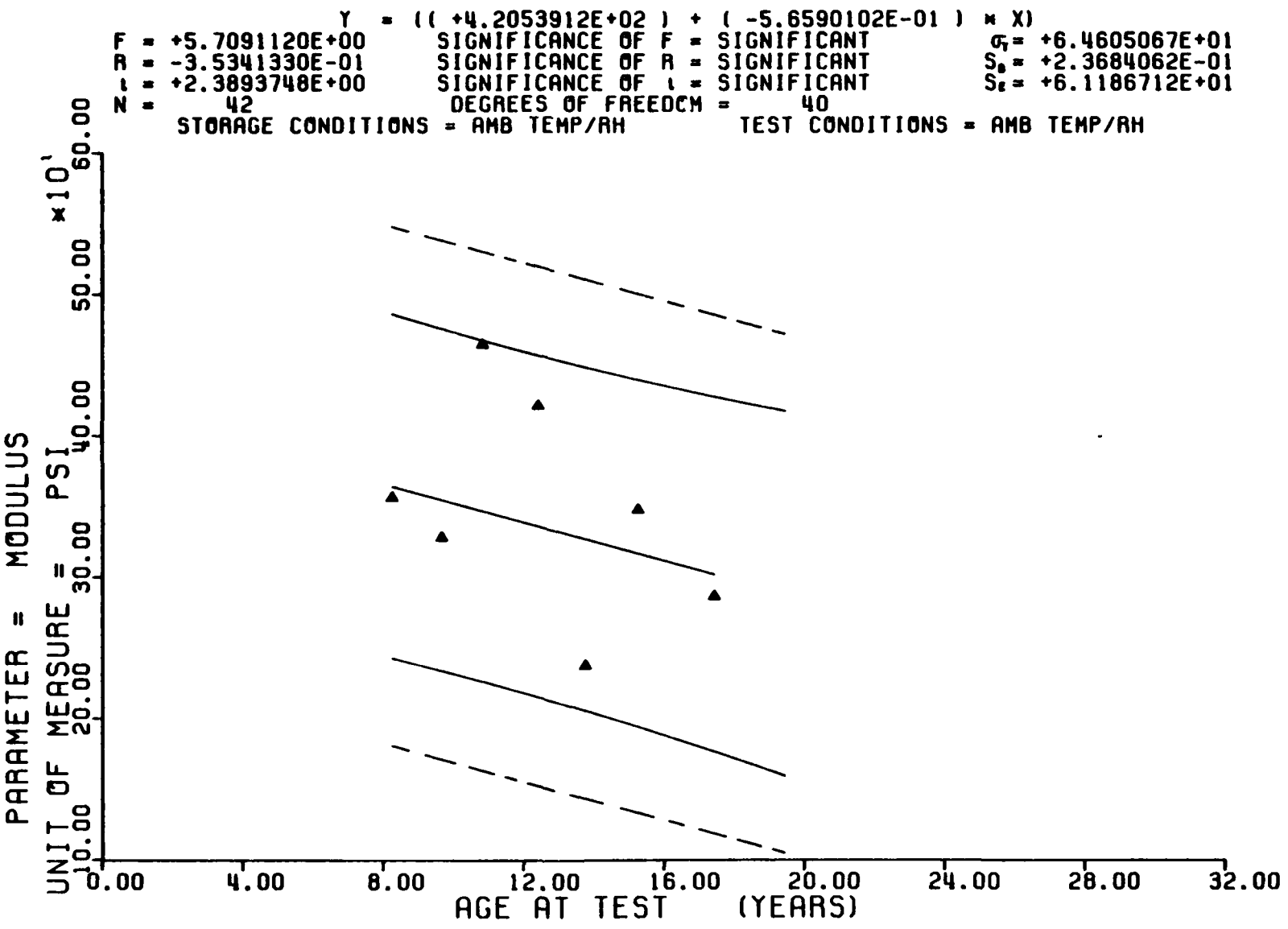

Y = ((+4.2053912E+02) + (-5.6590102E-01) * X)
F = +5.7091120E+00 SIGNIFICANCE OF F = SIGNIFICANT σT = +6.4605067E+01
R = -3.5341330E-01 SIGNIFICANCE OF R = SIGNIFICANT Se = +2.3684062E-01
t = +2.3893748E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +6.1186712E+01
N = 42 DEGREES OF FREEDOM = 40
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI *10¹
60.00
50.00
40.00
30.00
20.00
10.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR <0022788>,OUTER,AXIAL POS,V.L.RATE CHS=0.0002, MODULUS.

Figure 16

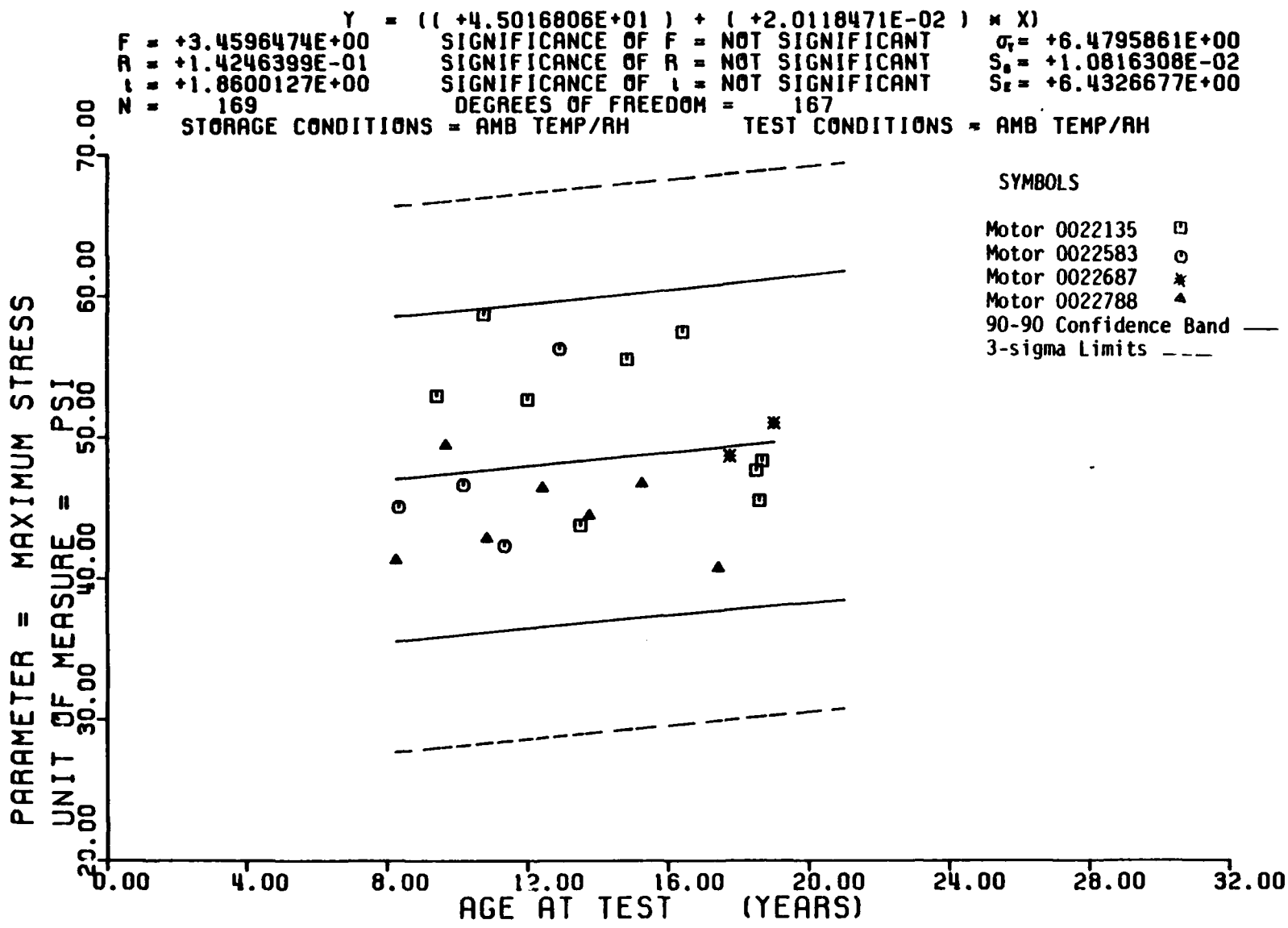

Y = ((+4.5016806E+01) + (+2.0118471E-02) * X)
F = +3.4596474E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +6.4795861E+00
R = +1.4246399E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Se = +1.0816308E-02
t = +1.8600127E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sr = +6.4326677E+00
N = 169 DEGREES OF FREEDOM = 167
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
70.00
60.00
50.00
40.00
30.00
20.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS, INNER, AXIAL POS, V.L. RATE CHS=0.0002 IN/MIN, MAXIMUM STRESS

Figure 17

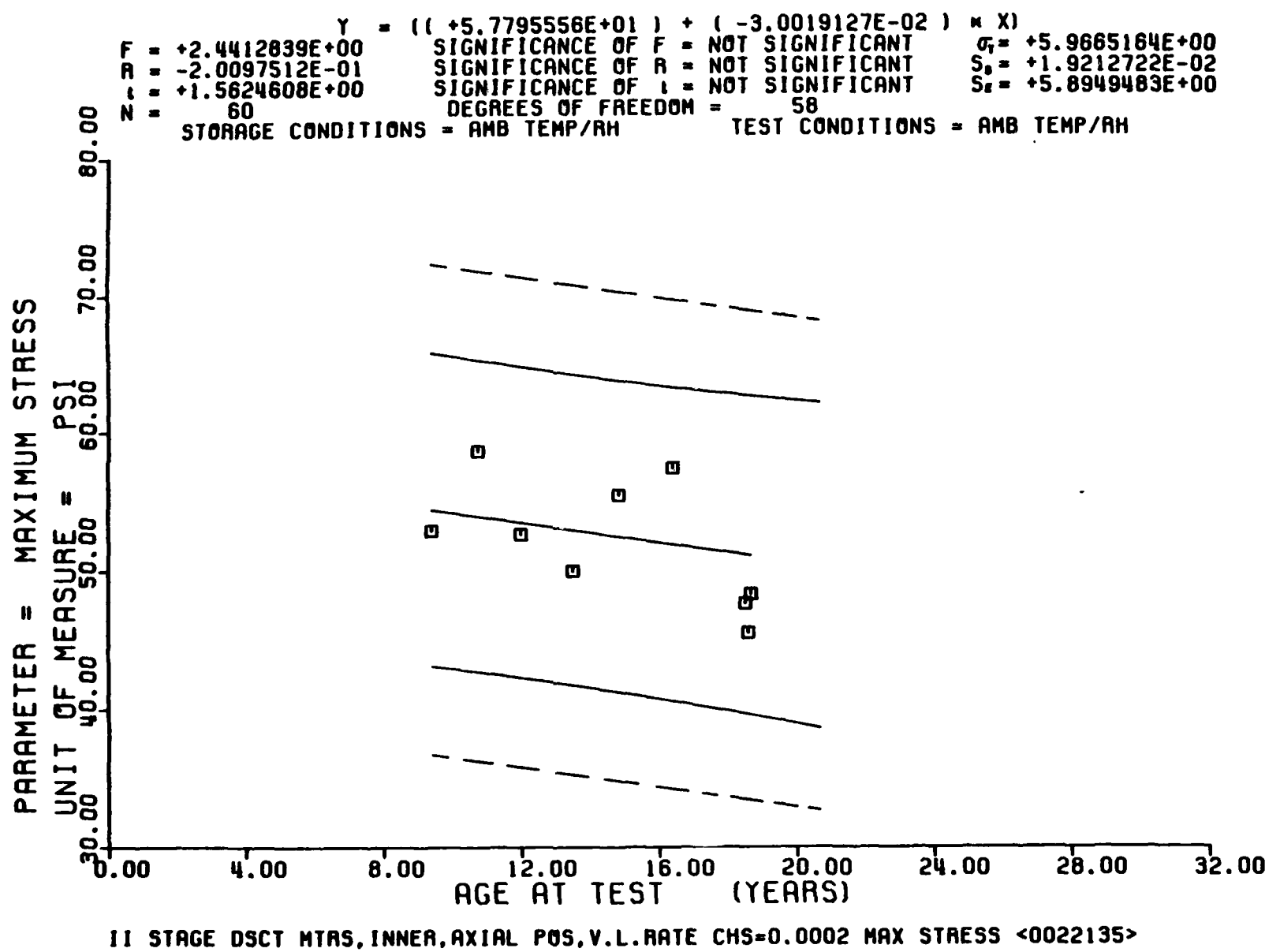

Y = ((+5.7795556E+01) + (-3.0019127E-02) * X)
F = +2.4412839E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σ_T = +5.9665164E+00
R = -2.0097512E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT S_e = +1.9212722E-02
t = +1.5624608E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT S_E = +5.8949483E+00
N = 60 DEGREES OF FREEDOM = 58
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
80.00
70.00
60.00
50.00
40.00
30.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS, INNER, AXIAL POS, V.L.RATE CHS=0.0002 MAX STRESS <0022135>

Figure 18

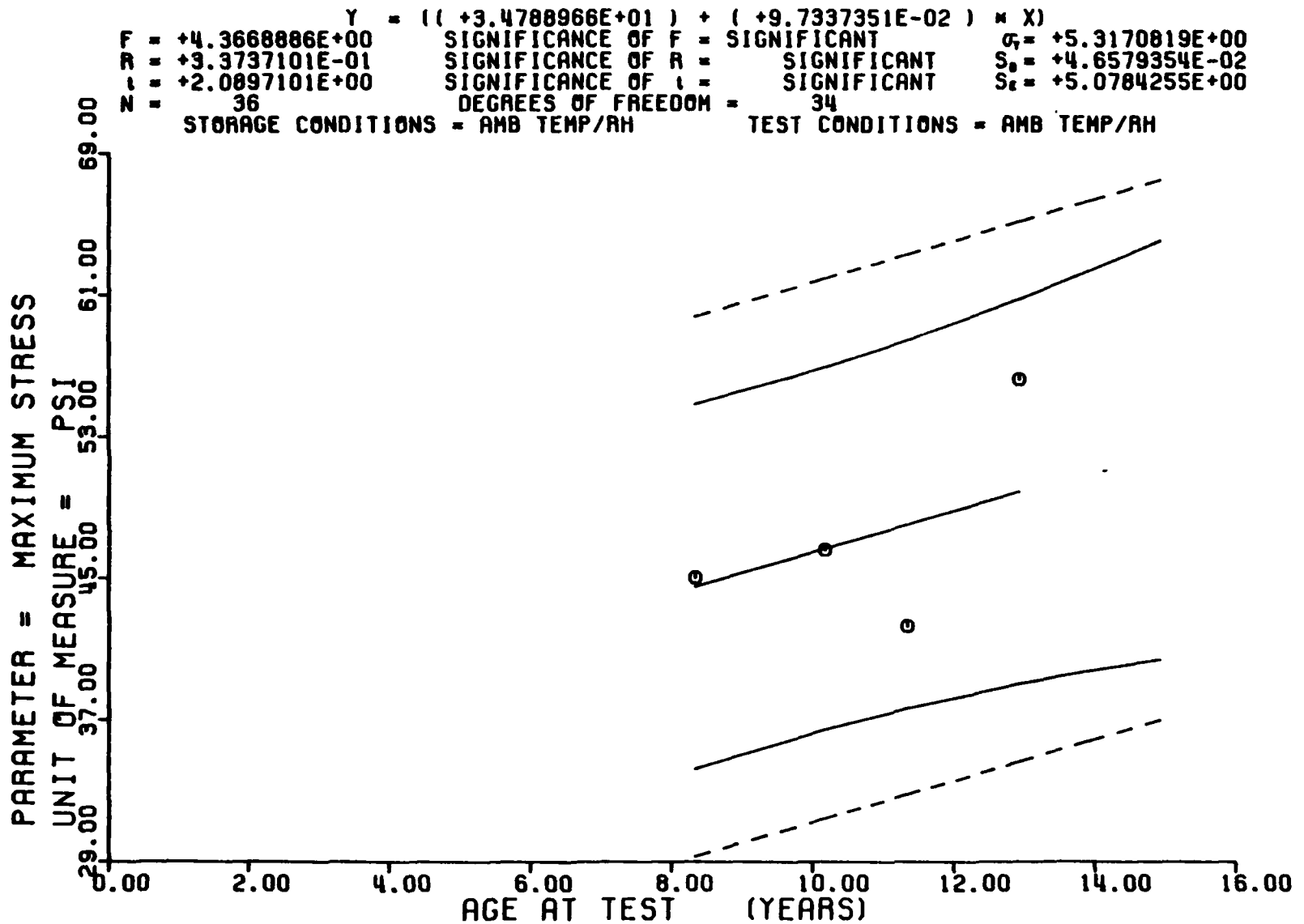

Y = ((+3.4788966E+01) + (+9.7337351E-02) * X)
F = +4.3668886E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +3.3737101E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.0897101E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 36 DEGREES OF FREEDOM = 34
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
σT = +5.3170819E+00
Se = +4.6579354E-02
Sx = +5.0784255E+00
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
29.00
37.00
45.00
53.00
61.00
69.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS, INNER, AXIAL POS, V.L.RATE CHS=0.0002 MAX STRESS <0022583>

Figure 19

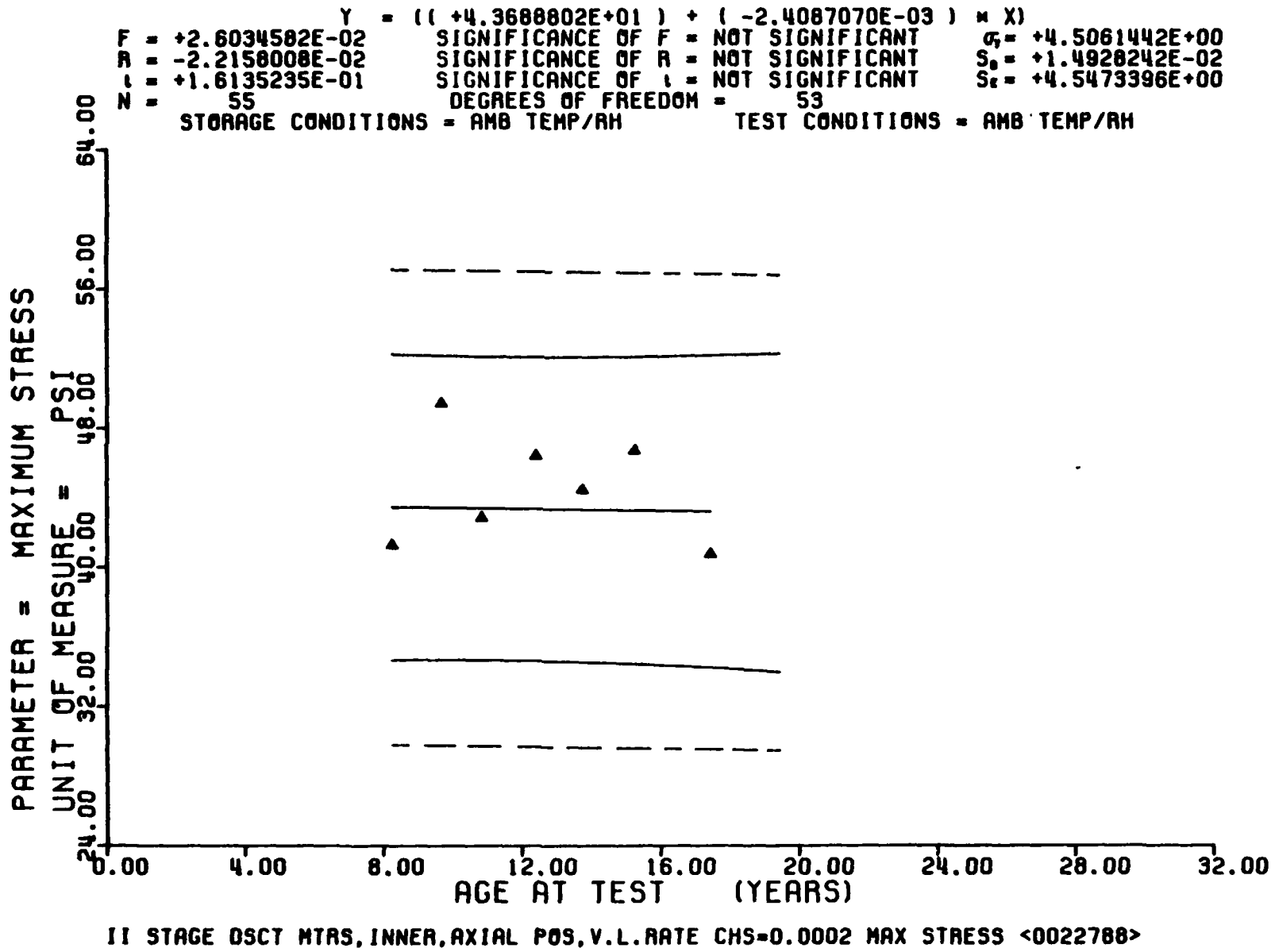

Y = ((+4.3688802E+01) + (-2.4087070E-03) * X)
F = +2.6034582E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT σ_T = +4.5061442E+00
R = -2.2158008E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT S_e = +1.4928242E-02
t = +1.6135235E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT S_t = +4.5473396E+00
N = 55 DEGREES OF FREEDOM = 53
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
64.00
56.00
48.00
40.00
32.00
24.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,INNER,AXIAL POS,V.L.RATE CHS=0.0002 MAX STRESS <0022788>

Figure 20

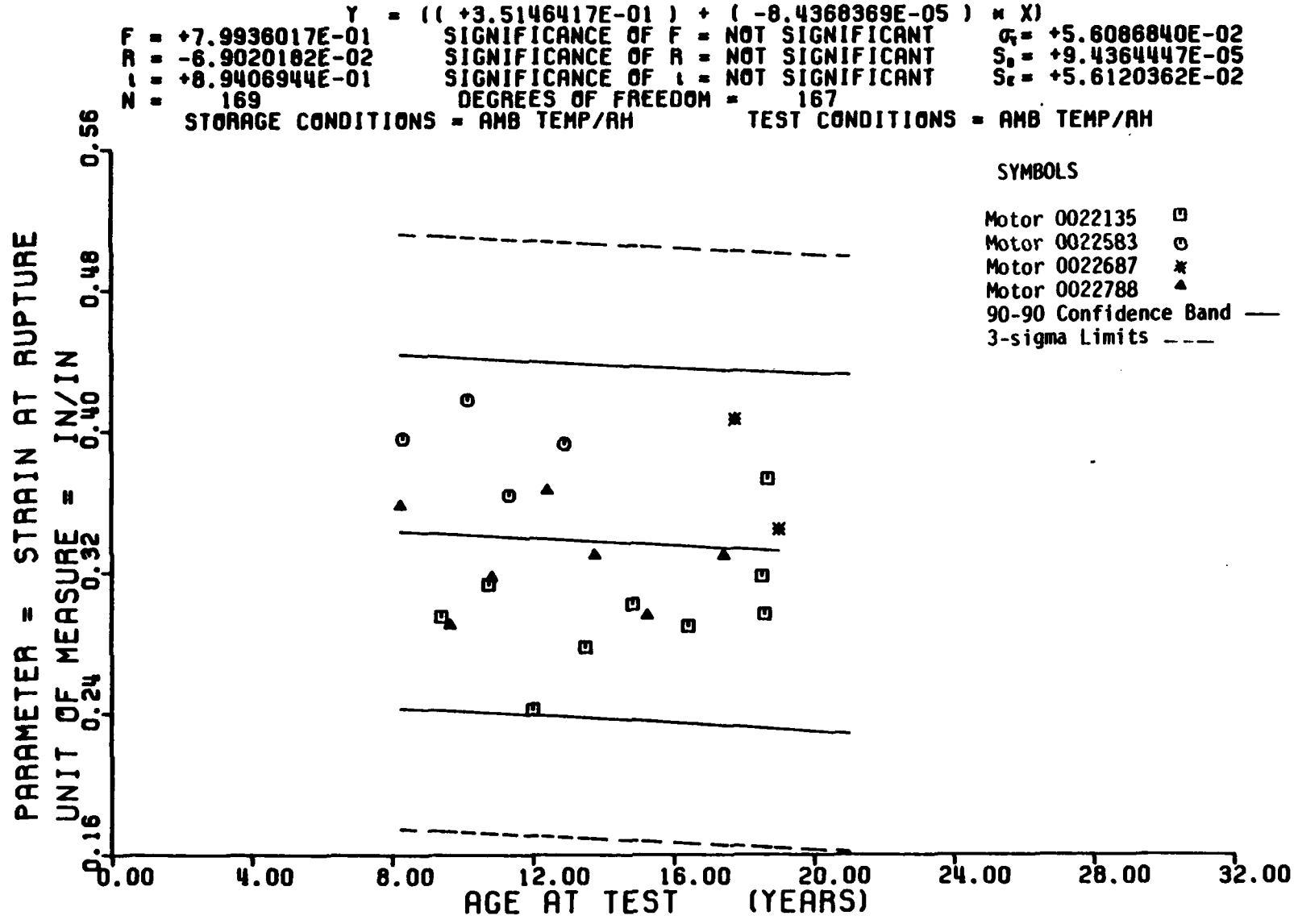
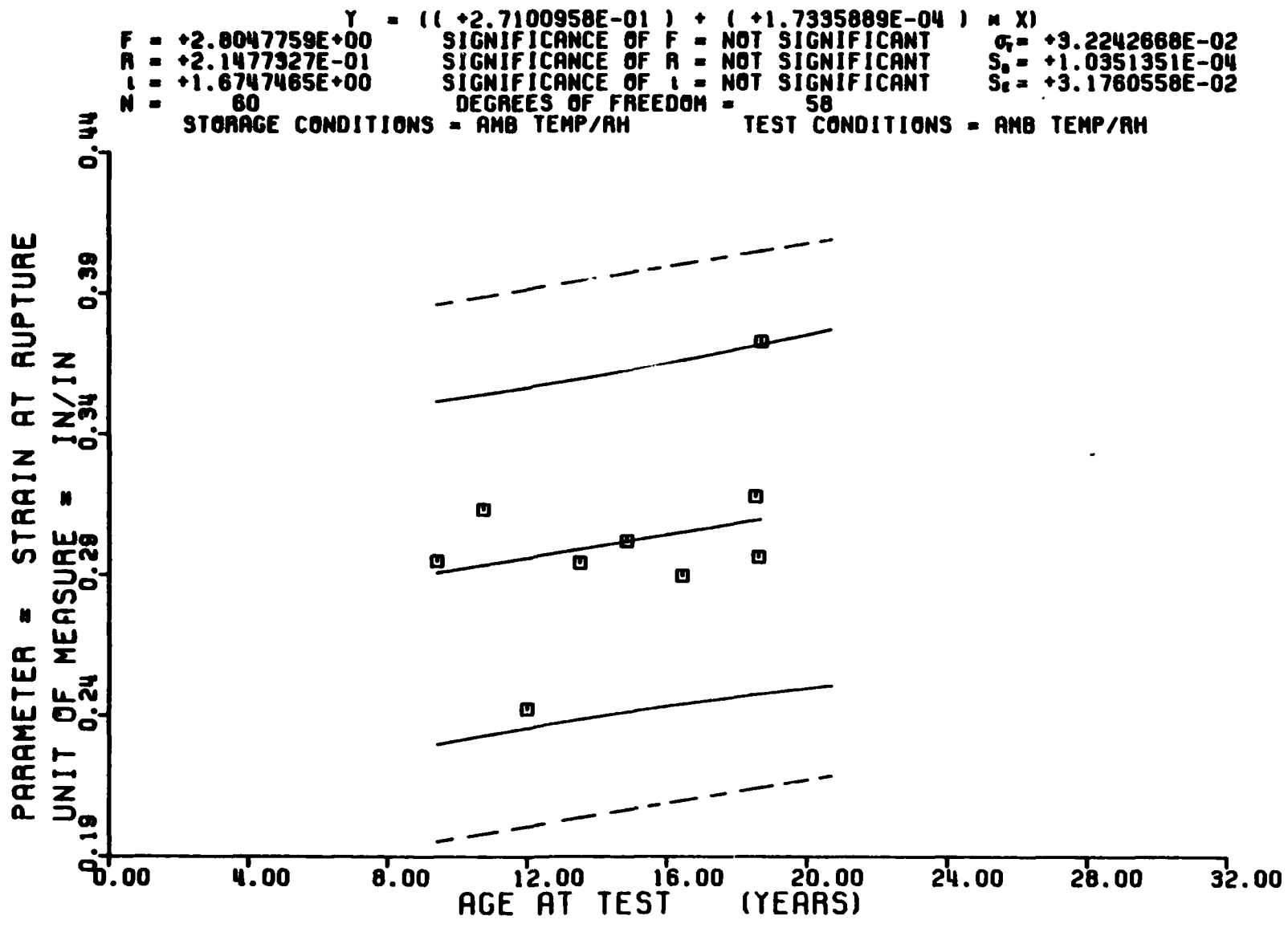
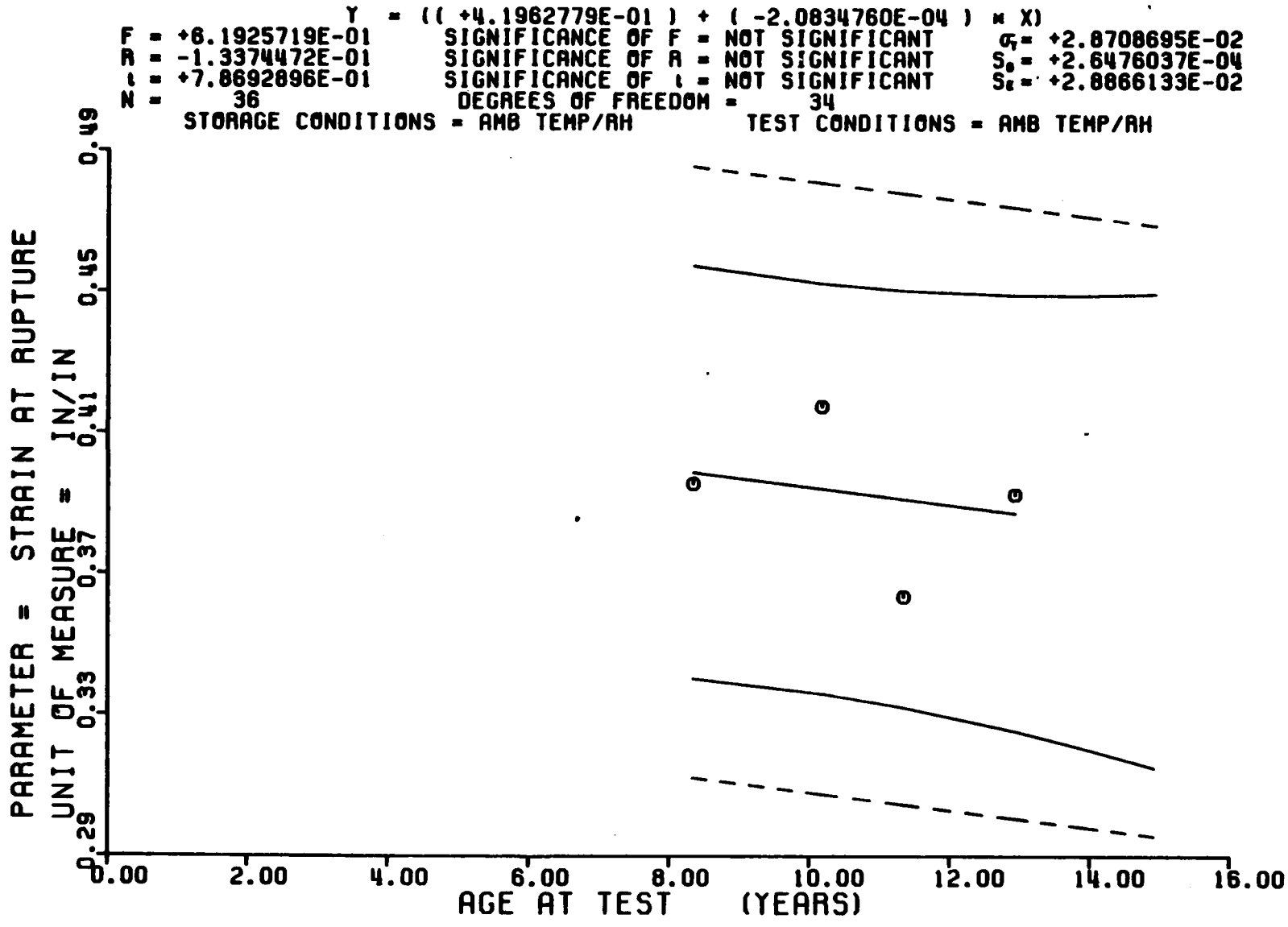

Y = ((+3.5146417E-01) + (-8.4368369E-05) * X)
F = +7.9936017E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +5.6086840E-02
R = -6.9020182E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +9.4364447E-05
t = +8.9406944E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +5.6120362E-02
N = 169 DEGREES OF FREEDOM = 167
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.16
0.24
0.32
0.40
0.48
0.56
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS, INNER, AXIAL POS, V.L.RATE CHS=0.0002 IN/MIN, STRAIN/RUPTURE

Figure 21



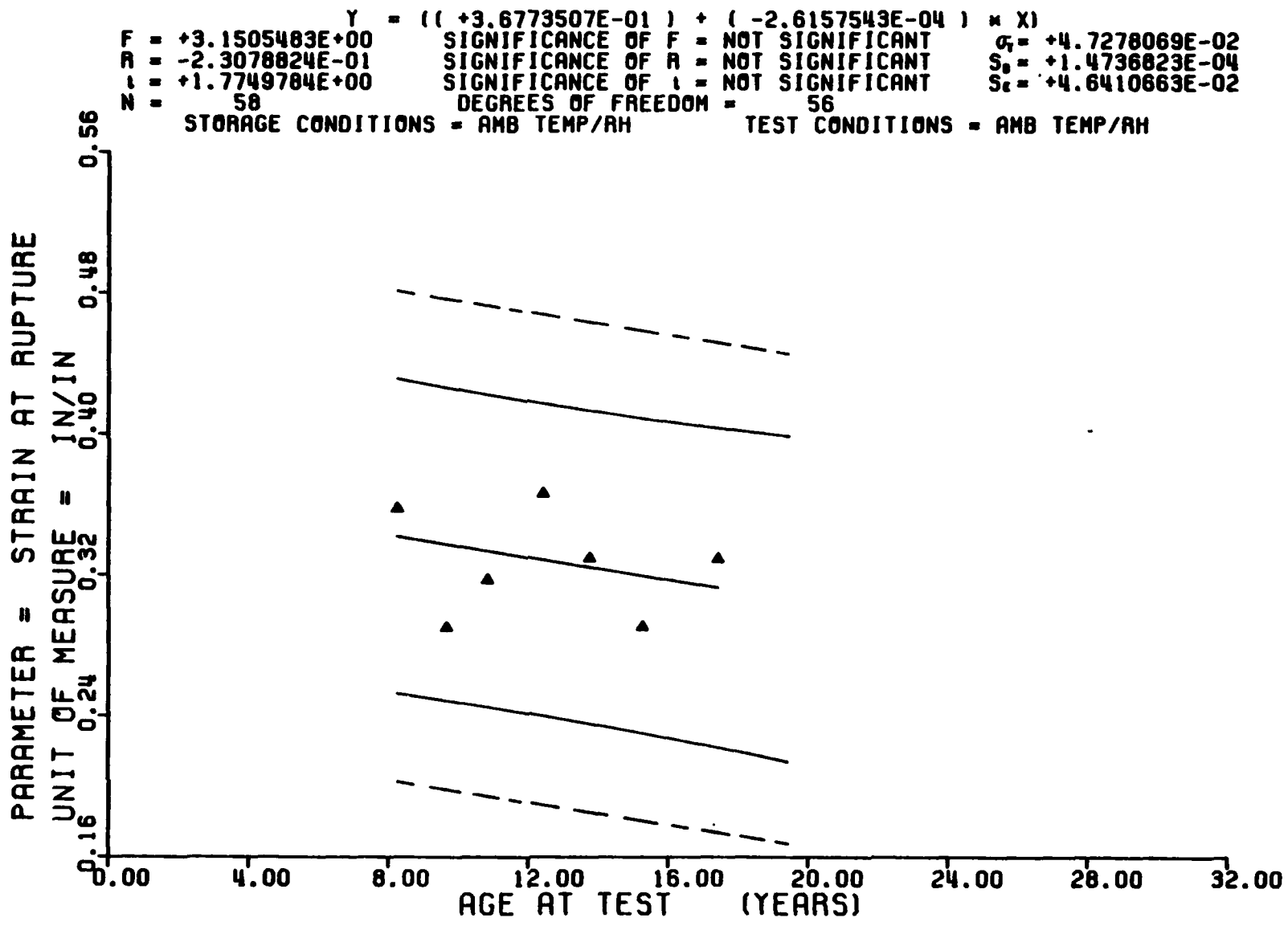
II STAGE DSCT MTR <0022135>, INNER, AXIAL POS, V.L.RATE CHS=0.0002, STRAIN RUPTURE.

Figure 22



II STAGE DSCT MTR <0022583>, INNER, AXIAL POS, V.L. RATE CHS=0.0002, STRAIN RUPTURE.

Figure 23



II STAGE OSCT MTR <0022788>, INNER, AXIAL POS, V.L. RATE CHS=0.0002, STRAIN RUPTURE.

Figure 24

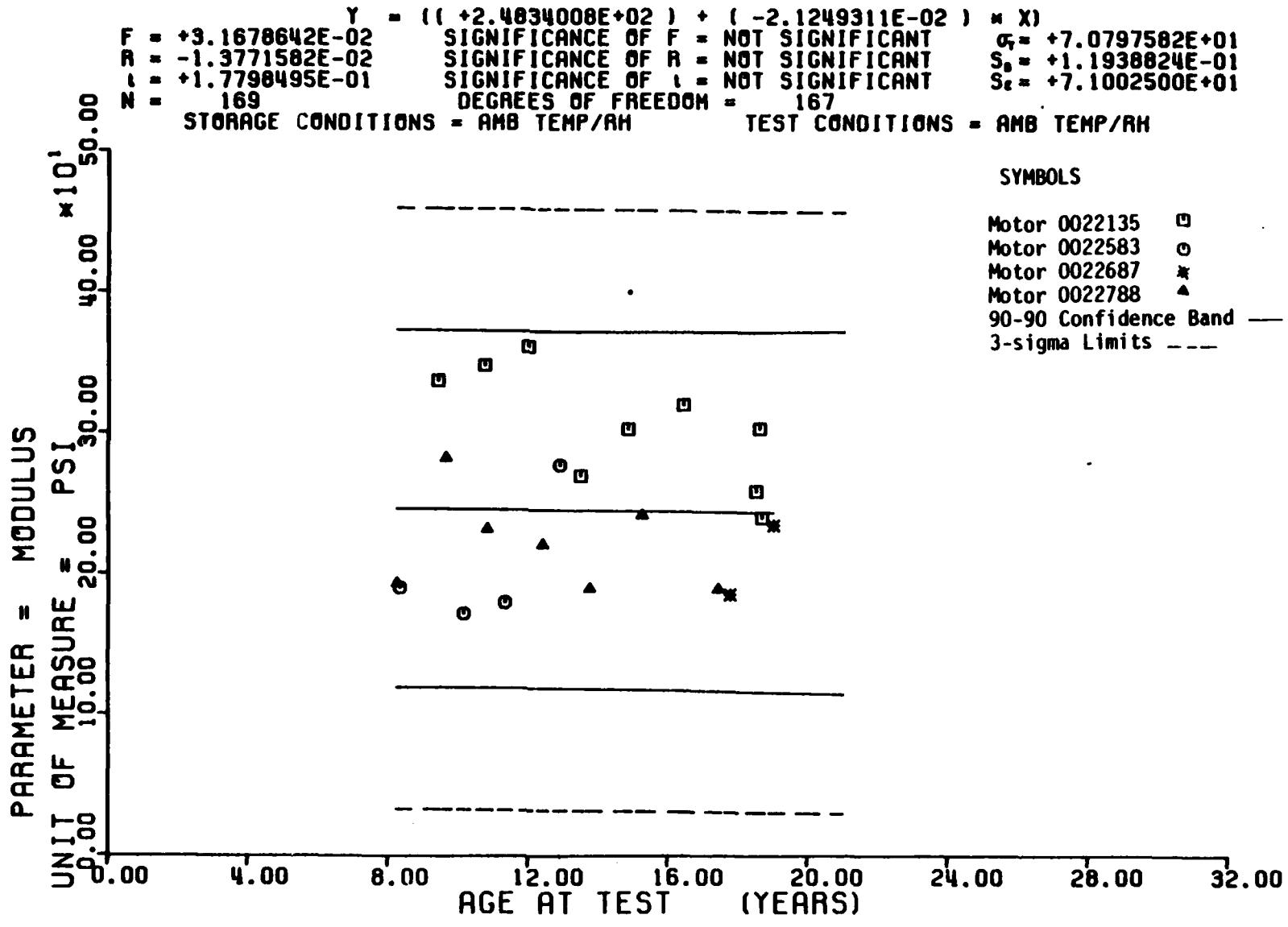

Y = ((+2.4834008E+02) + (-2.1249311E-02) * X)
F = +3.1678642E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT
R = -1.3771582E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT
t = +1.7798495E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT
N = 169 DEGREES OF FREEDOM = 167
σT = +7.0797582E+01
Sb = +1.1938824E-01
Sε = +7.1002500E+01
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MODULUS
UNIT OF MEASURE = PSI x10¹
0.00
10.00
20.00
30.00
40.00
50.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS, INNER, AXIAL POS, V.L.RATE CHS=0.0002 IN/MIN, MODULUS

Figure 25

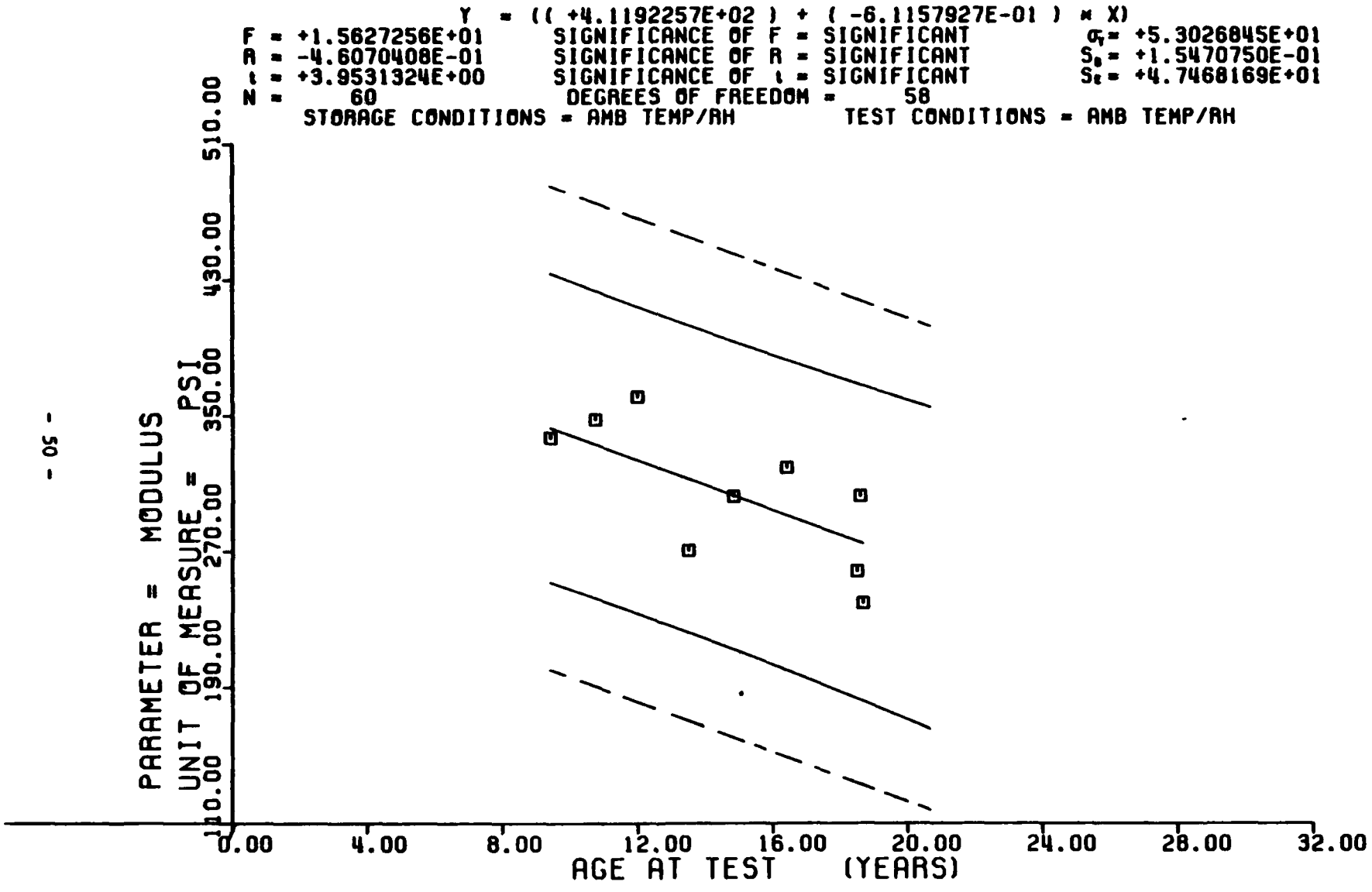
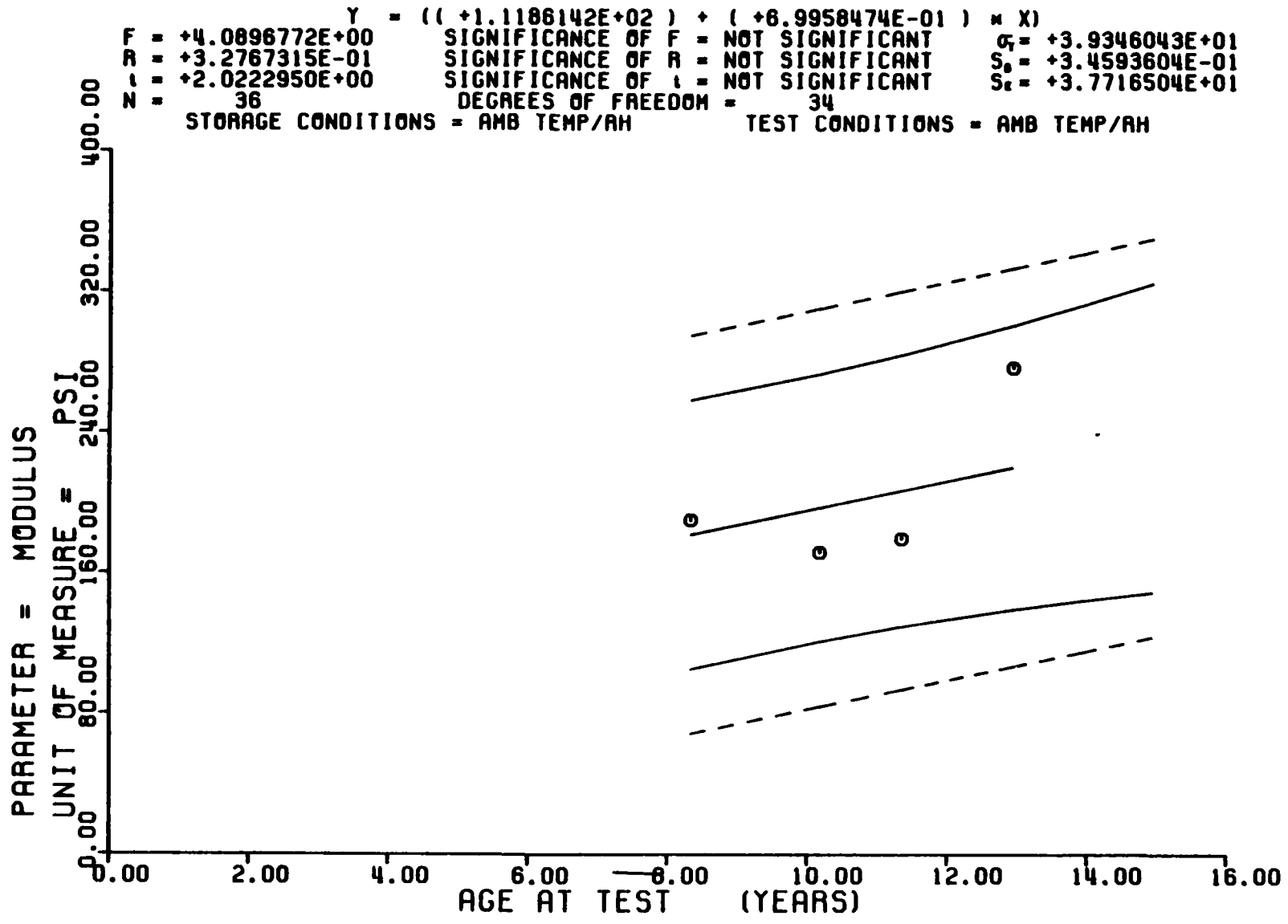
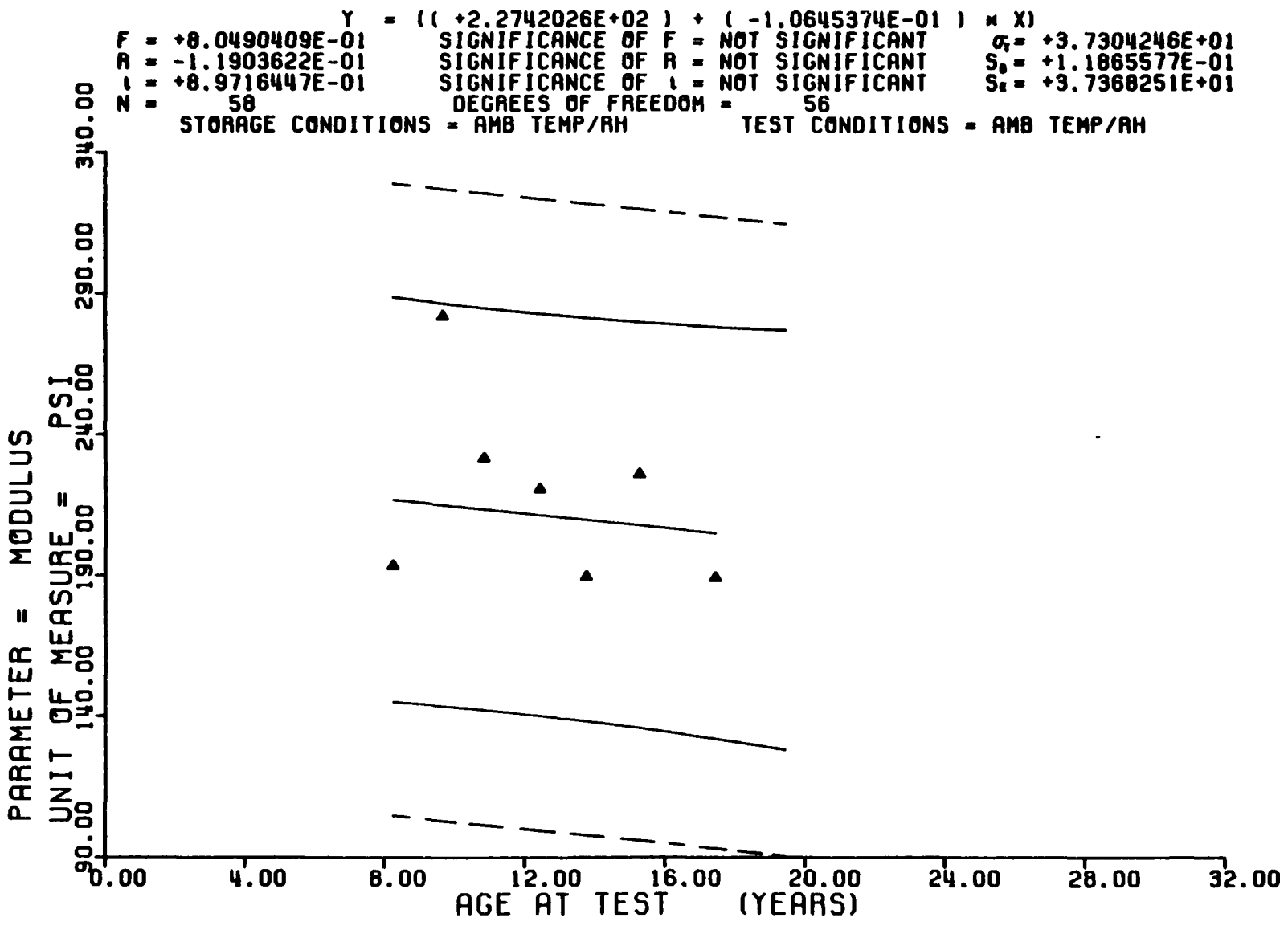

Y = ((+4.1192257E+02) + (-6.1157927E-01) * X)
F = +1.5627256E+01 SIGNIFICANCE OF F = SIGNIFICANT σt = +5.3026845E+01
R = -4.6070408E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.5470750E-01
t = +3.9531324E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +4.7468169E+01
N = 60 DEGREES OF FREEDOM = 58
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
510.00
430.00
350.00
270.00
190.00
110.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR <0022135>, INNER, AXIAL POS, V.L.RATE CHS=0.0002, MODULUS.

Figure 26



II STAGE DSCT MTR <0022583>, INNER, AXIAL POS, V.L.RATE CHS=0.0002, MODULUS.

Figure 27



II STAGE DSCT MTR <0022788>, INNER, AXIAL POS, V.L.RATE CHS=0.0002, MODULUS.

Figure 28

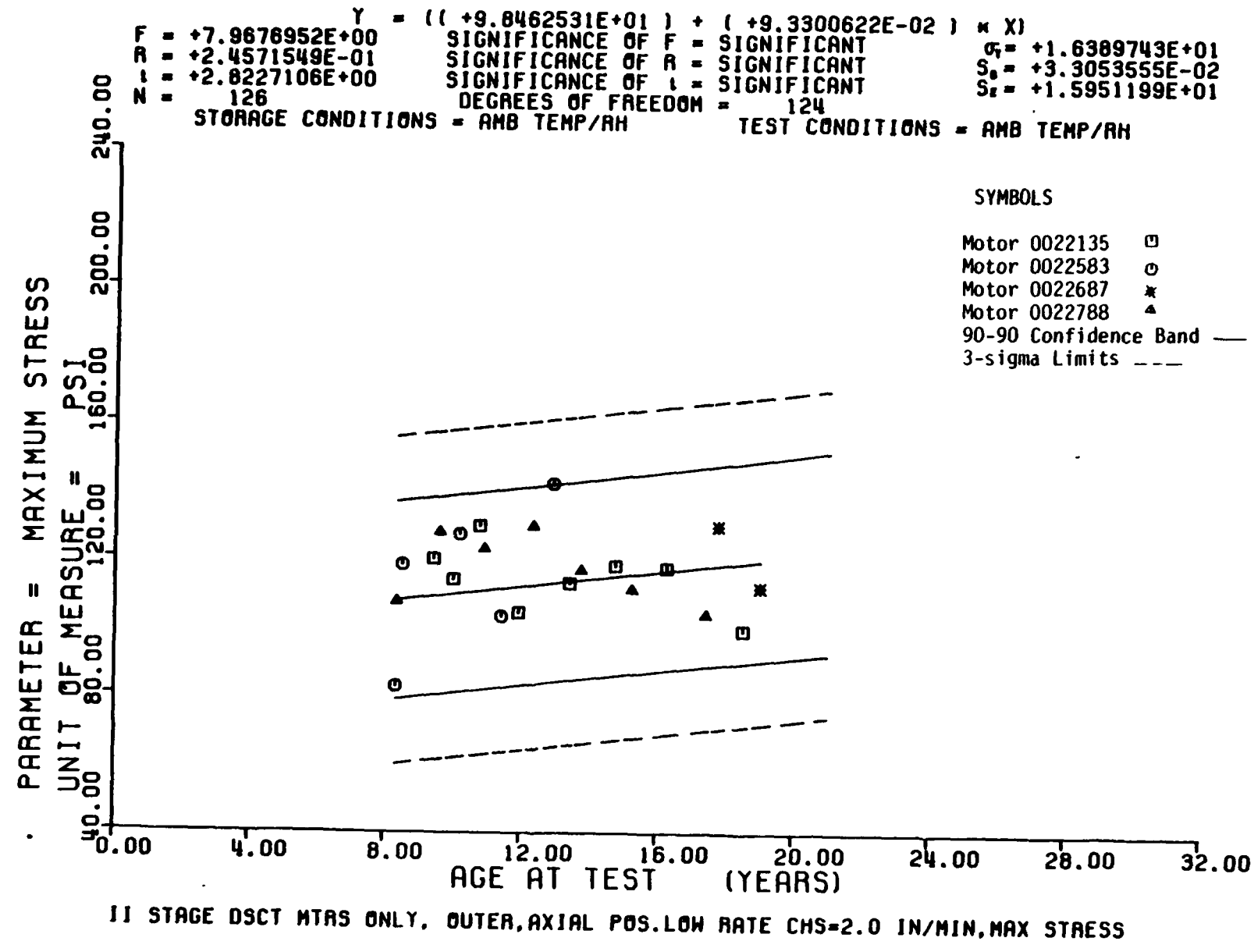

Y = ((+9.8462531E+01) + (+9.3300622E-02) * X)
F = +7.9676952E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +2.4571549E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.8227106E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 126 DEGREES OF FREEDOM = 124
σT = +1.6389743E+01
Se = +3.3053555E-02
Sx = +1.5951199E+01
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
240.00
200.00
160.00
120.00
80.00
40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER,AXIAL POS.LOW RATE CHS=2.0 IN/MIN,MAX STRESS

Figure 29

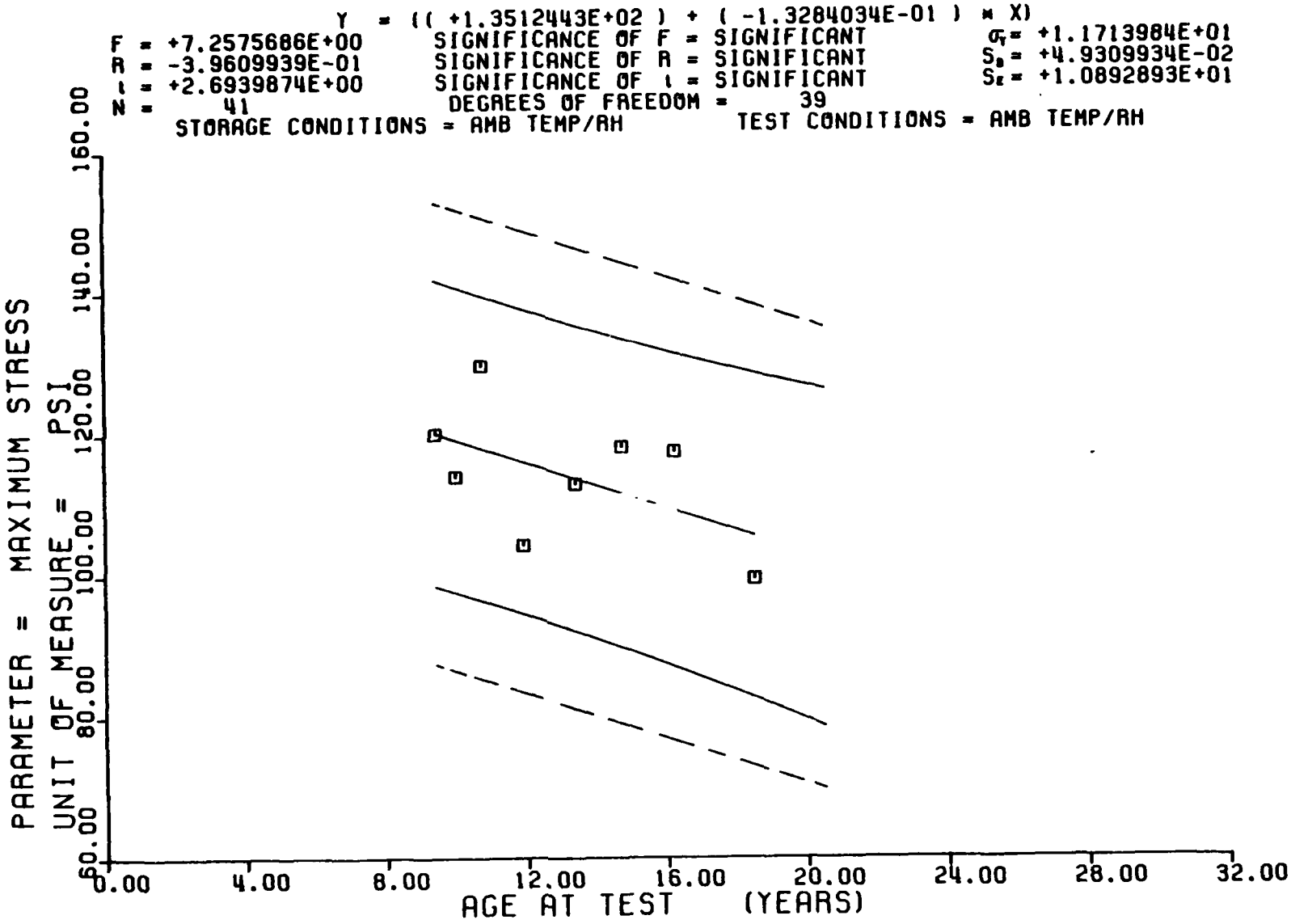

Y = ((+1.3512443E+02) + (-1.3284034E-01) * X)
F = +7.2575686E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = -3.9609939E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.6939874E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 41 DEGREES OF FREEDOM = 39
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
160.00
140.00
120.00
100.00
80.00
60.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER,AXIAL POS.LOW RATE CHS=2.0 MAX STRESS <0022135>

Figure 30

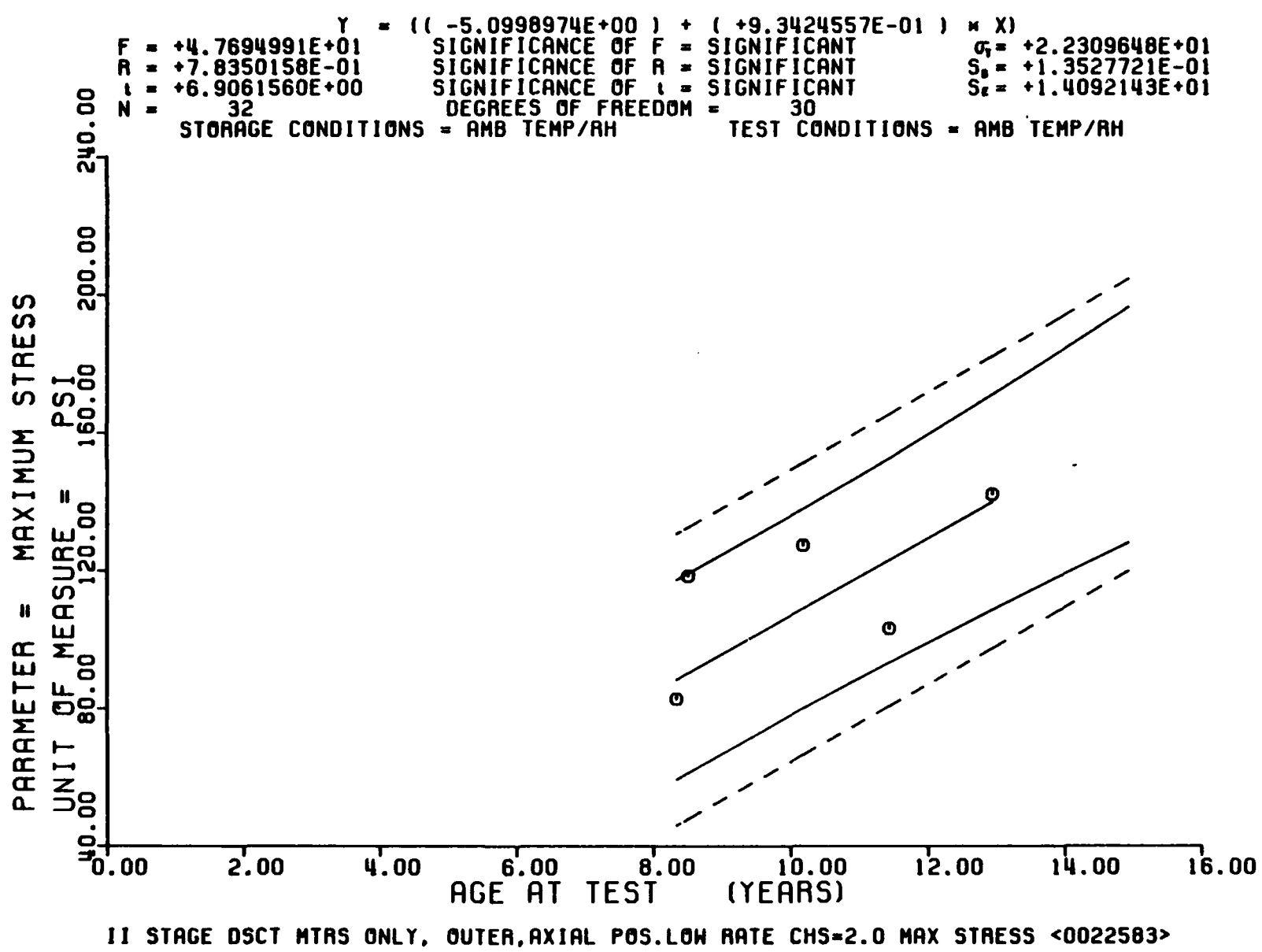

Y = ((-5.0998974E+00) + (+9.3424557E-01) * X)
F = +4.7694991E+01 SIGNIFICANCE OF F = SIGNIFICANT σ_Y = +2.2309648E+01
R = +7.8350158E-01 SIGNIFICANCE OF R = SIGNIFICANT S_B = +1.3527721E-01
t = +6.9061560E+00 SIGNIFICANCE OF t = SIGNIFICANT S_E = +1.4092143E+01
N = 32 DEGREES OF FREEDOM = 30
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
240.00
200.00
160.00
120.00
80.00
40.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER,AXIAL POS.LOW RATE CHS=2.0 MAX STRESS <0022583>

Figure 31

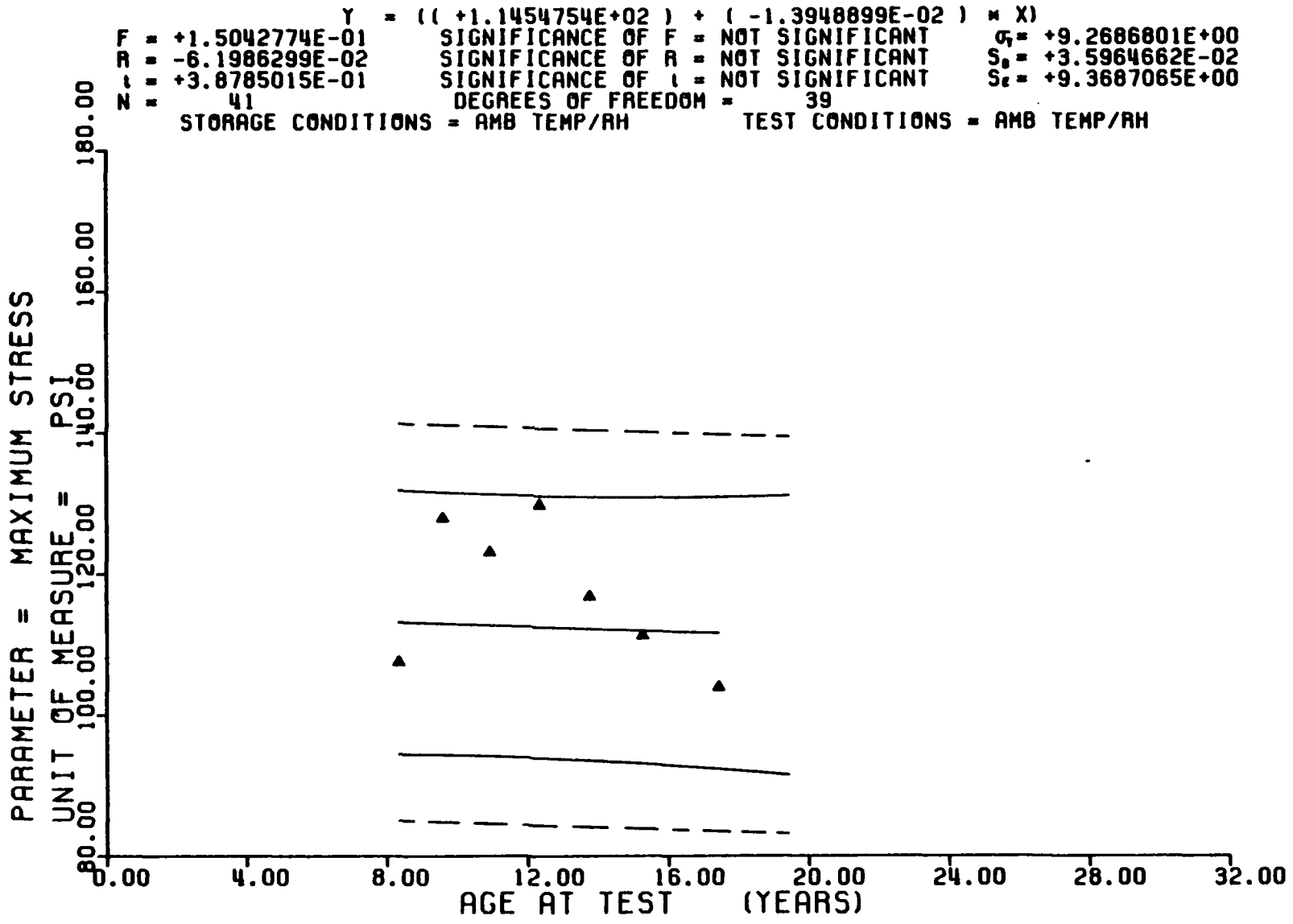

Y = ((+1.1454754E+02) + (-1.3948899E-02) * X)
F = +1.5042774E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σ_Y = +9.2686801E+00
R = -6.1986299E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT S_e = +3.5964662E-02
t = +3.8785015E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT S_ε = +9.3687065E+00
N = 41 DEGREES OF FREEDOM = 39
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
180.00
160.00
140.00
120.00
100.00
80.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER,AXIAL POS.LOW RATE CHS=2.0 MAX STRESS <0022788>

Figure 32

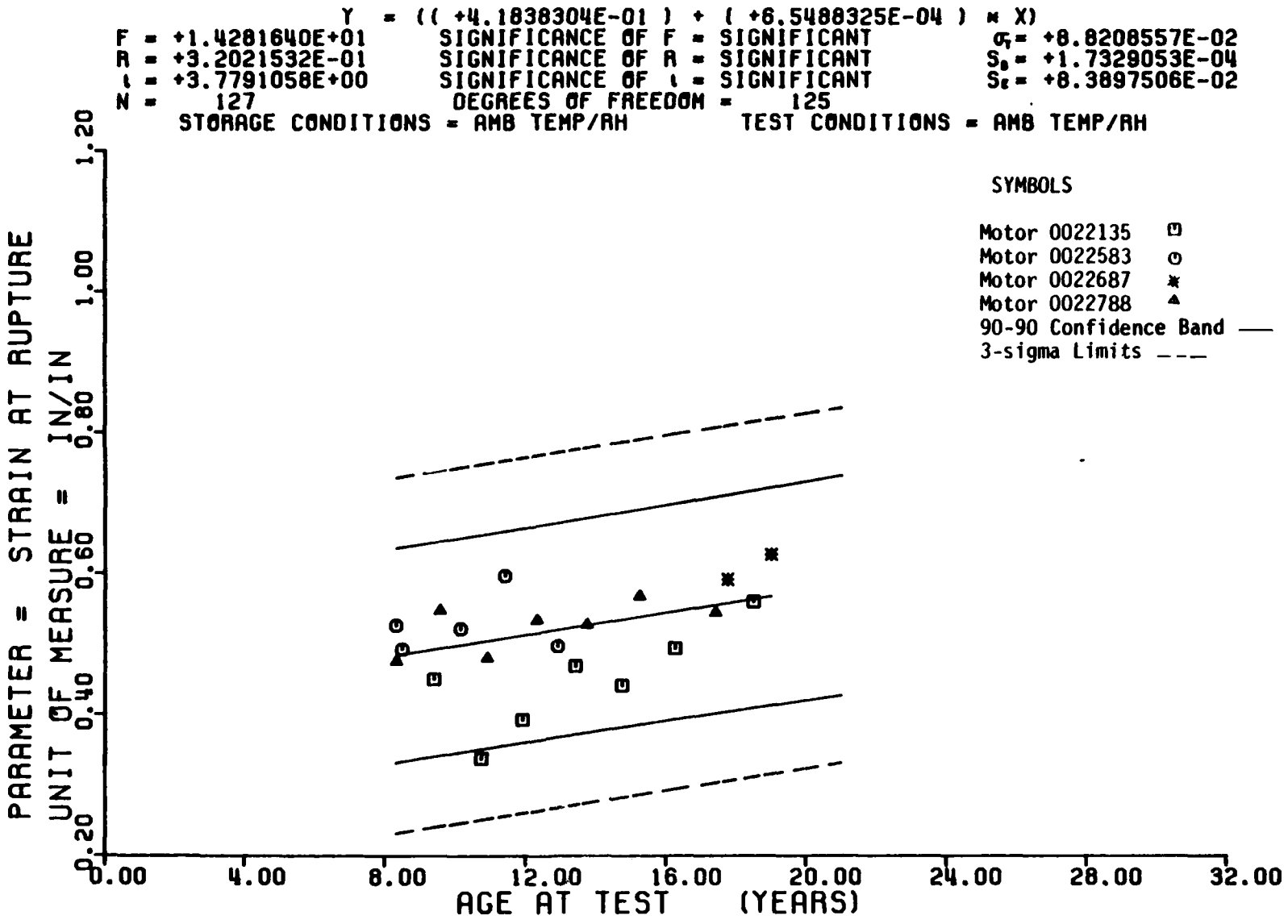

Y = ((+4.1838304E-01) + (+6.5488325E-04) * X)
F = +1.4281640E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +3.2021532E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +3.7791058E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 127 DEGREES OF FREEDOM = 125
σt = +8.8208557E-02
Sb = +1.7329053E-04
Se = +8.3897506E-02
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.20
0.40
0.60
0.80
1.00
1.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER, AXIAL POS. LOW RATE CHS=2.0 IN/MIN, STRAIN/RUPTURE

Figure 33

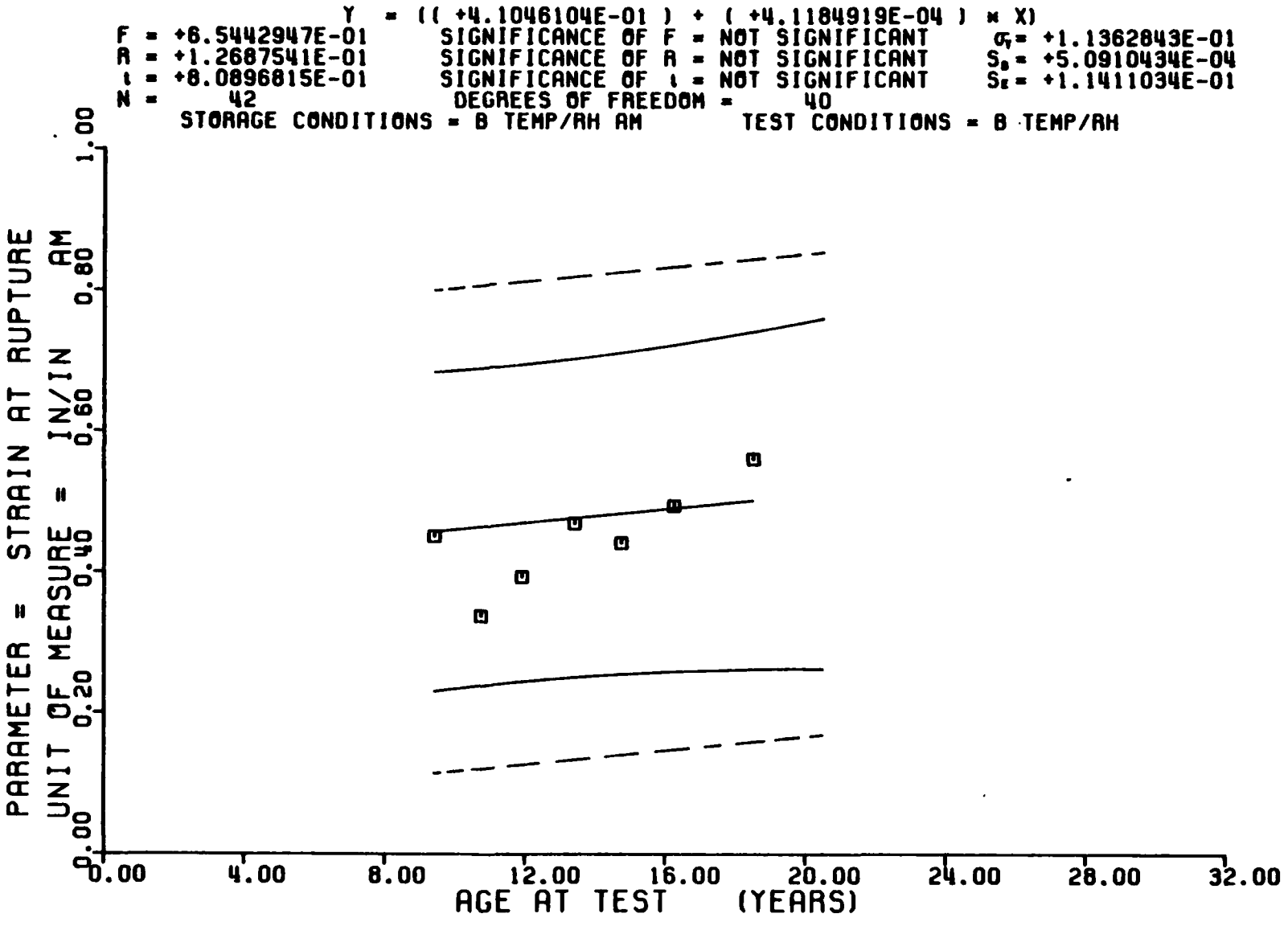

Y = ((+4.1046104E-01) + (+4.1184919E-04) * X)
F = +6.5442947E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +1.1362843E-01
R = +1.2687541E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +5.0910434E-04
t = +8.0896815E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +1.1411034E-01
N = 42 DEGREES OF FREEDOM = 40
STORAGE CONDITIONS = B TEMP/RH AM TEST CONDITIONS = B TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN AM
0.00
0.20
0.40
0.60
0.80
1.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER,AXIAL POS.LOW RATE CHS=2.0 STN RUPTUR <0022135>

Figure 34

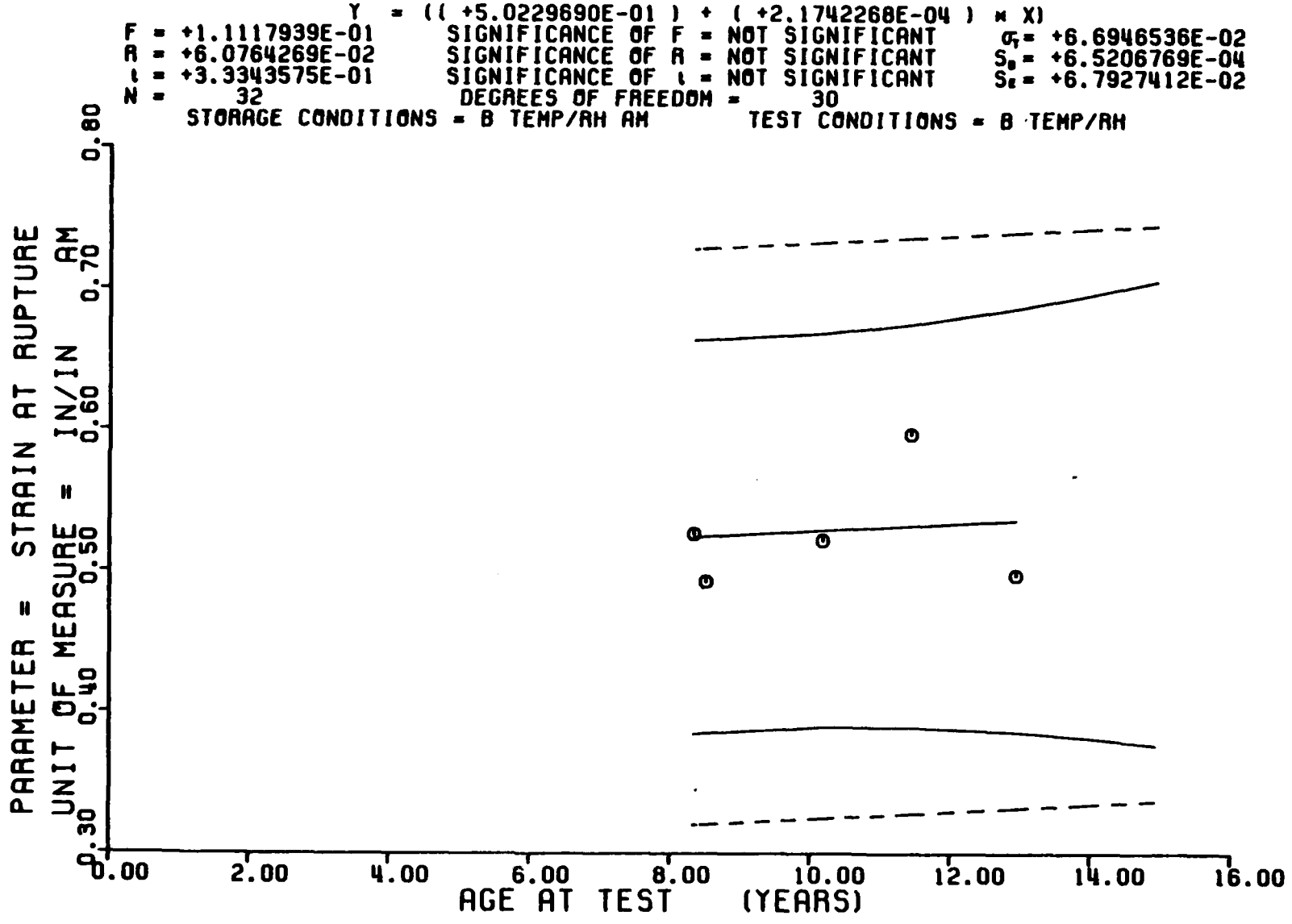

Y = ((+5.0229690E-01) + (+2.1742268E-04) * X)
F = +1.1117939E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σ = +6.6946536E-02
R = +6.0764269E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT S = +6.5206769E-04
t = +3.3343575E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT S = +6.7927412E-02
N = 32 DEGREES OF FREEDOM = 30
STORAGE CONDITIONS = B TEMP/RH AM TEST CONDITIONS = B TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN AM
0.80
0.70
0.60
0.50
0.40
0.30
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER,AXIAL POS.LOW RATE CHS=2.0 STN RUPTUR <0022583>

Figure 35

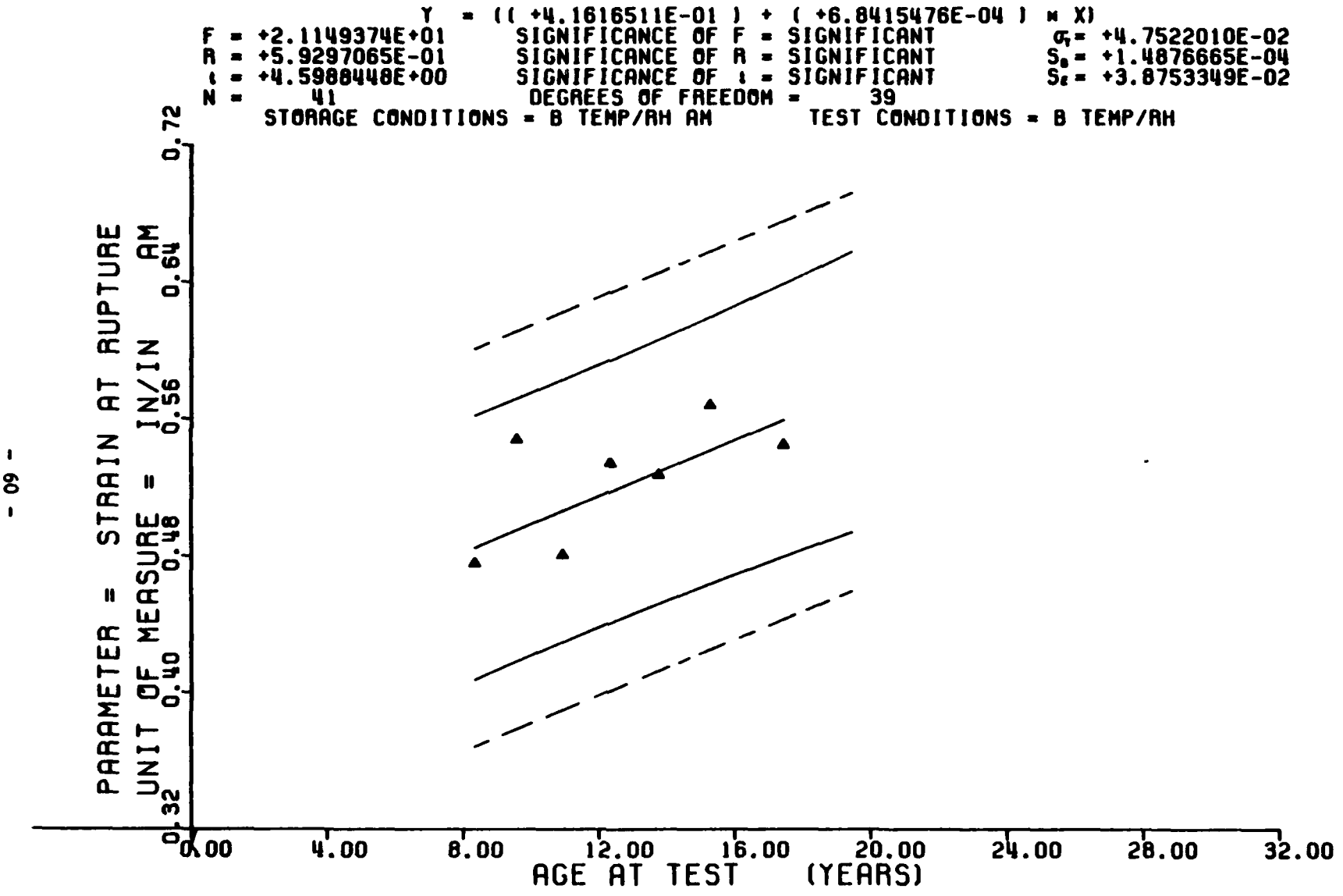

Y = ((+4.1616511E-01) + (+6.8415476E-04) * X)
F = +2.1149374E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +5.9297065E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +4.5988448E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 41 DEGREES OF FREEDOM = 39
STORAGE CONDITIONS = B TEMP/RH AM TEST CONDITIONS = B TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN AM
0.72
0.64
0.56
0.48
0.40
0.32
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER,AXIAL POS.LOW RATE CHS=2.0 STN RUPTUR <0022788>

Figure 36

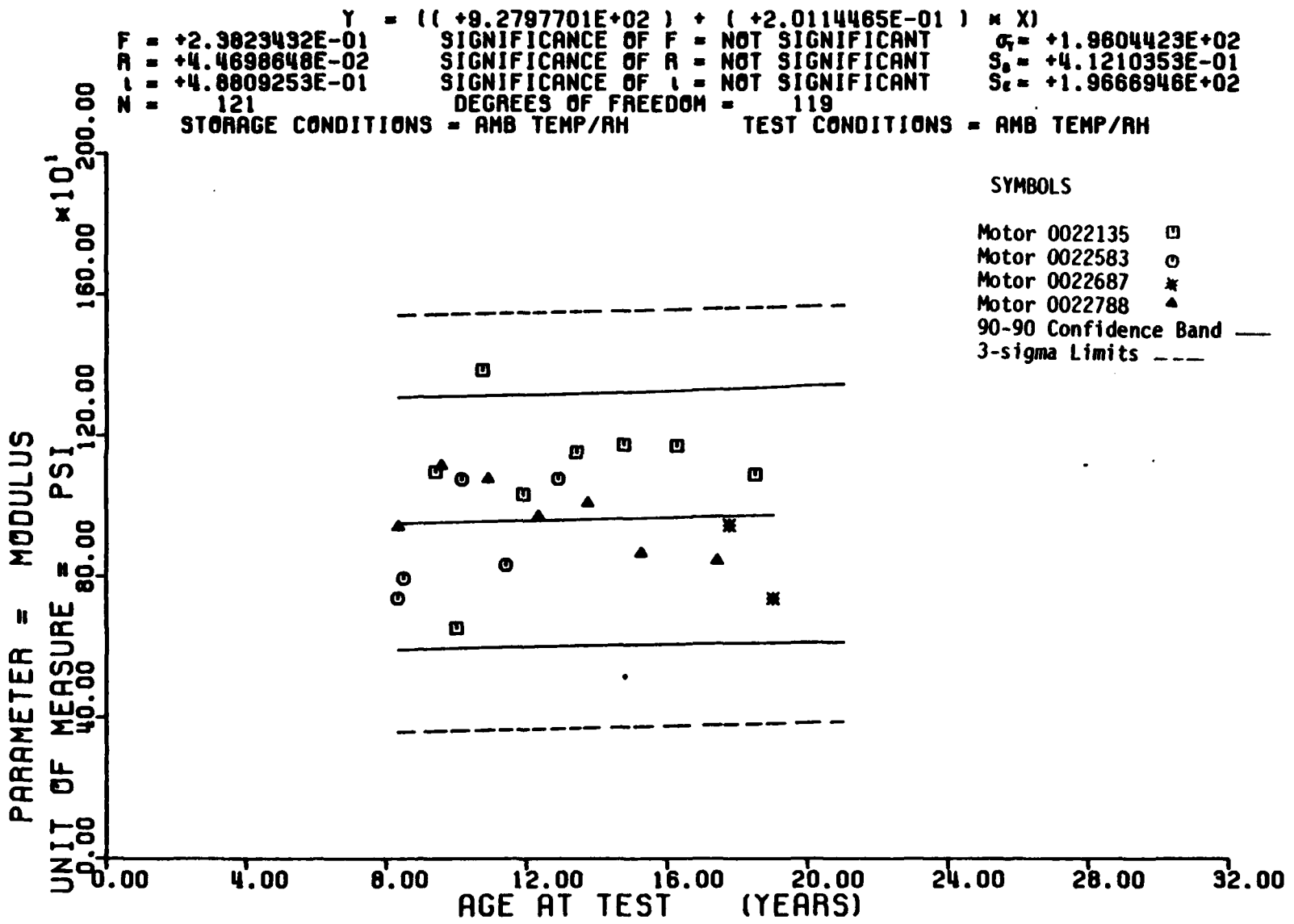
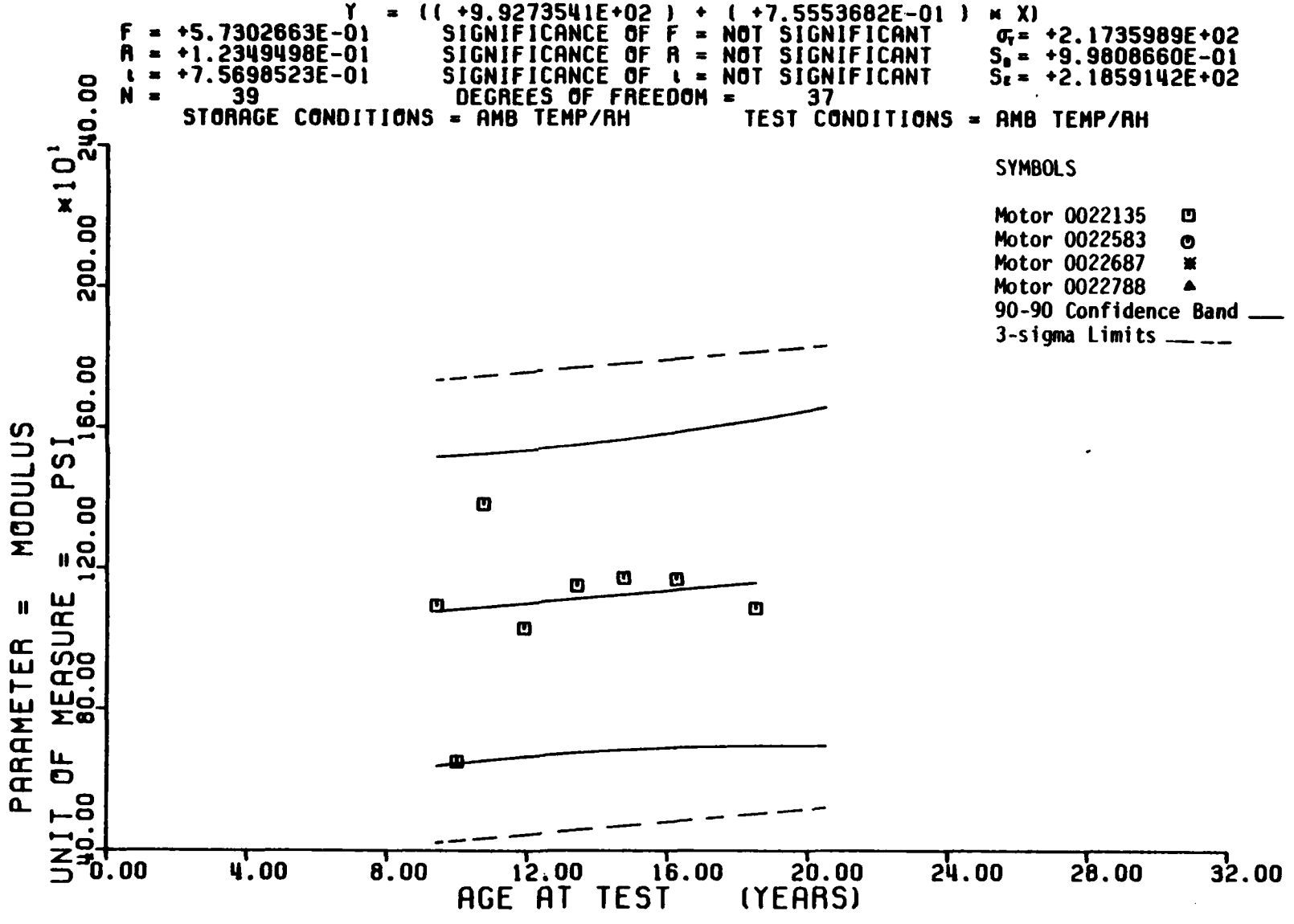
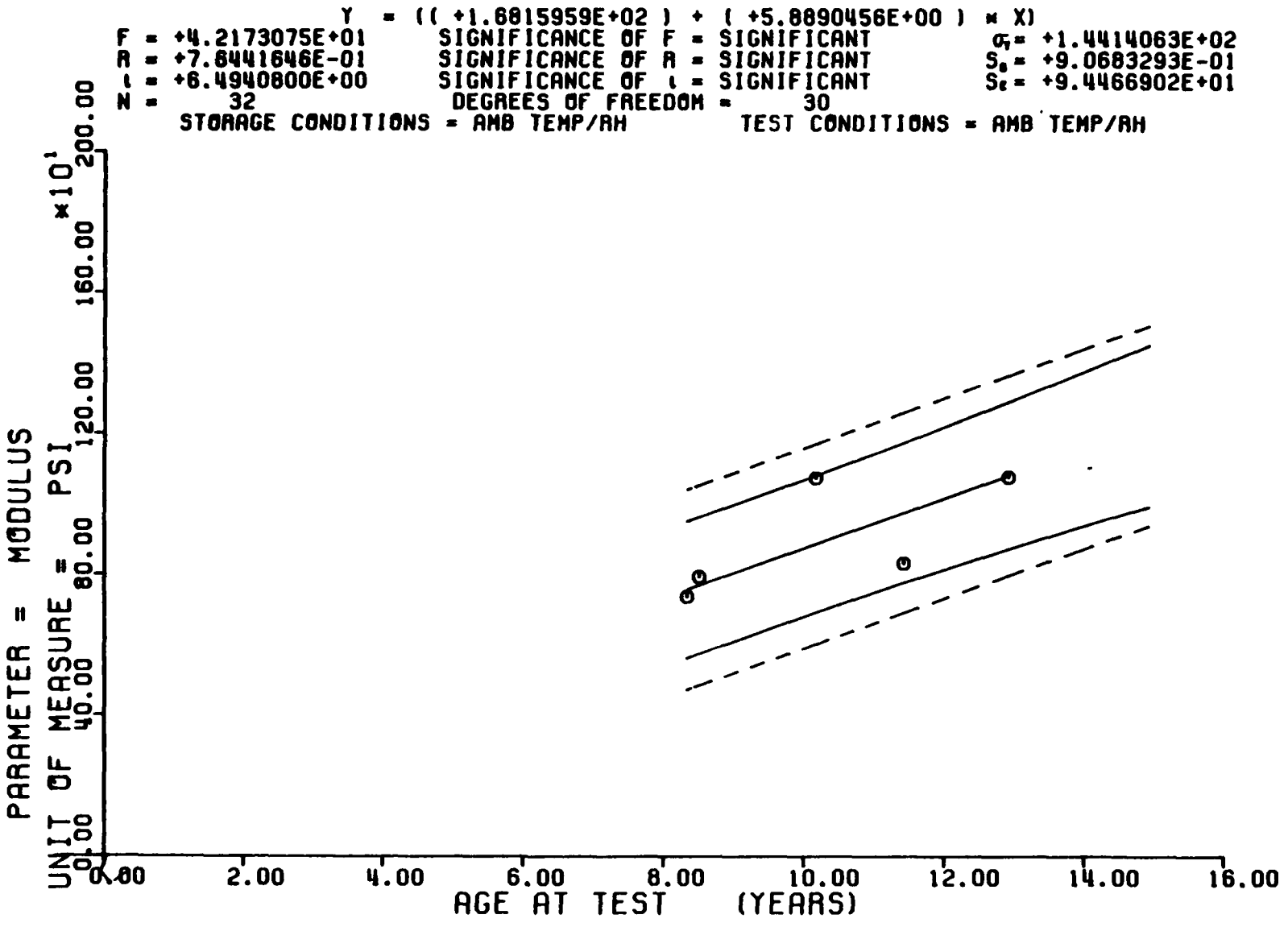

Y = ((+9.2797701E+02) + (+2.0114465E-01) * X)
F = +2.3823432E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σ_Y = +1.9604423E+02
R = +4.4698648E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT S_B = +4.1210353E-01
ι = +4.8809253E-01 SIGNIFICANCE OF ι = NOT SIGNIFICANT S_E = +1.9666946E+02
N = 121 DEGREES OF FREEDOM = 119
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
*10¹
200.00
160.00
120.00
80.00
40.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER,AXIAL POS.LOW RATE CHS=2.0 IN/MIN, MODULUS

Figure 37



II STAGE,DSCT MTRS,ONLY, OUTER,AXIAL POS.LOW RATE CHS=2.0 <0022135> MODULUS

Figure 38



σ_t = +1.4414063E+02
S_e = +9.0683293E-01
S_t = +9.4466902E+01

II STAGE DSCT MTRS ONLY,OUTER,AXIAL POS. LOW RATE CHS=2.0 MODULUS <0022583>.

Figure 39

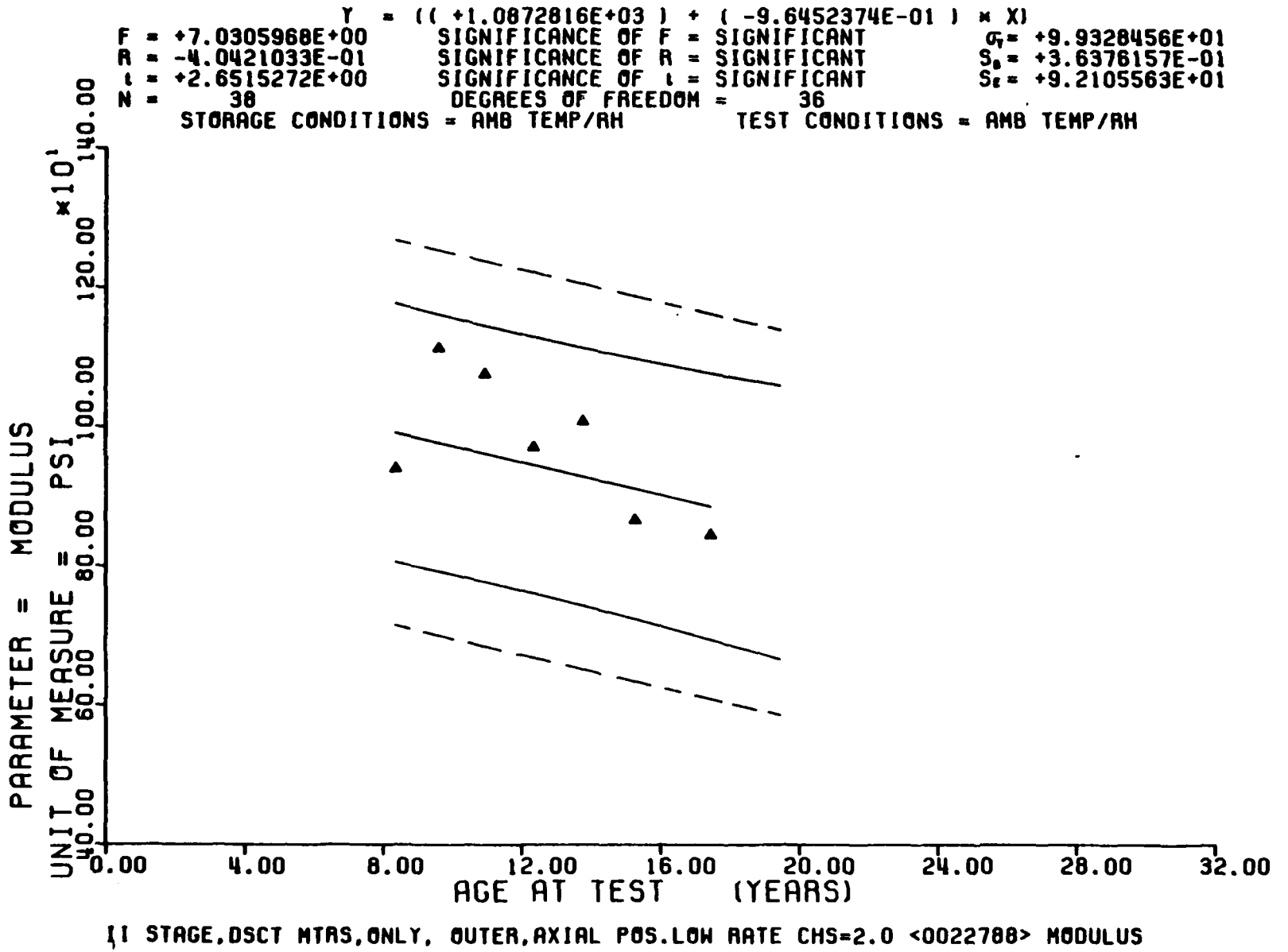

Y = ((+1.0872816E+03) + (-9.6452374E-01) * X)
F = +7.0305968E+00 SIGNIFICANCE OF F = SIGNIFICANT σy = +9.9328456E+01
R = -4.0421033E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +3.6376157E-01
t = +2.6515272E+00 SIGNIFICANCE OF t = SIGNIFICANT Sŷ = +9.2105563E+01
N = 38 DEGREES OF FREEDOM = 36
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
*10¹
140.00
120.00
100.00
80.00
60.00
40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE,DSCT MTRS,ONLY, OUTER,AXIAL POS.LOW RATE CHS=2.0 <0022788> MODULUS

Figure 40

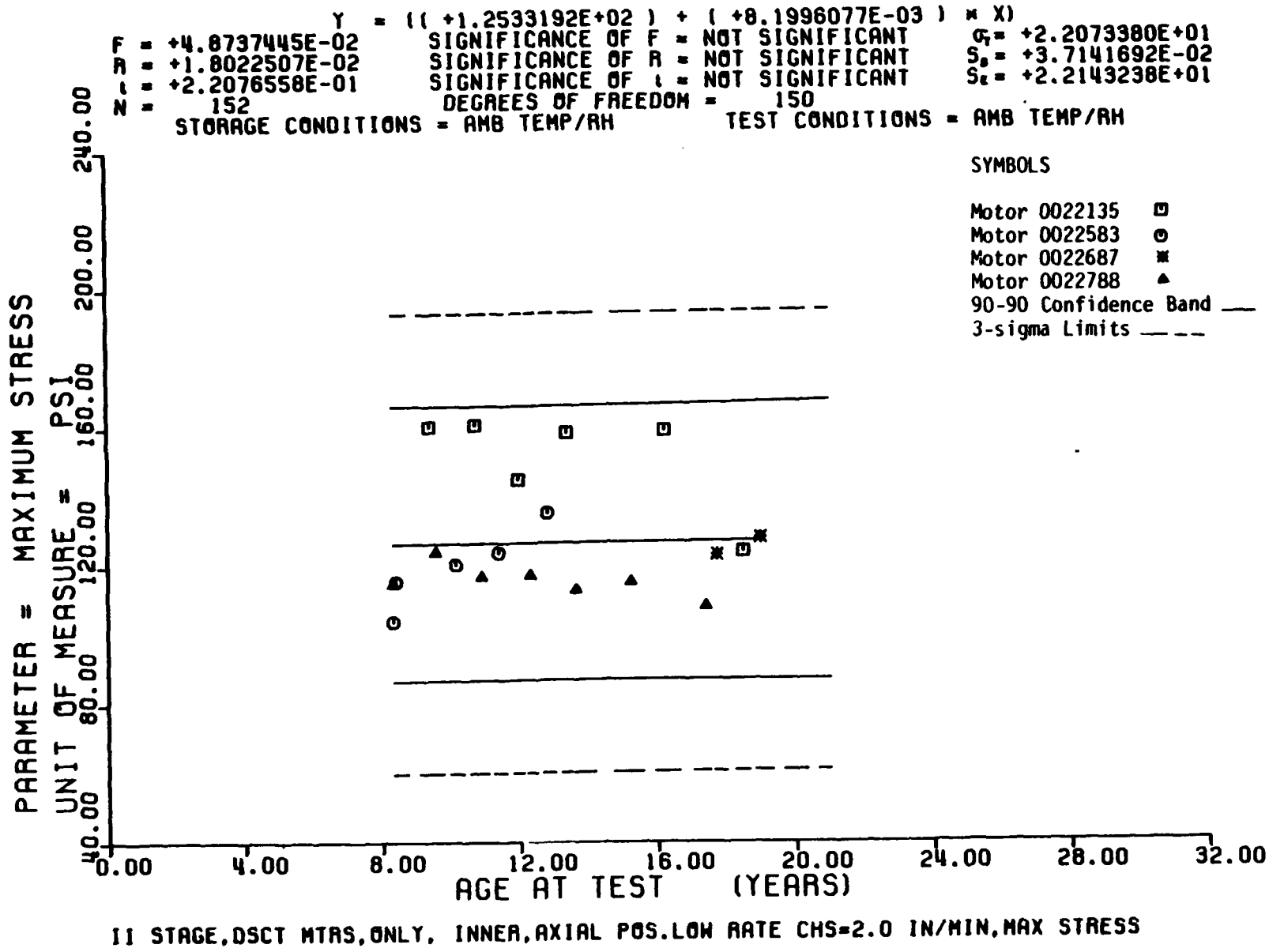

Y = ((+1.2533192E+02) + (+8.1996077E-03) * X)
F = +4.8737445E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT
R = +1.8022507E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT
t = +2.2076558E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT
N = 152 DEGREES OF FREEDOM = 150
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σT = +2.2073380E+01
Sb = +3.7141692E-02
Sε = +2.2143238E+01
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
240.00
200.00
160.00
120.00
80.00
40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE,DSCT MTRS,ONLY, INNER,AXIAL POS.LOW RATE CHS=2.0 IN/MIN,MAX STRESS

Figure 41

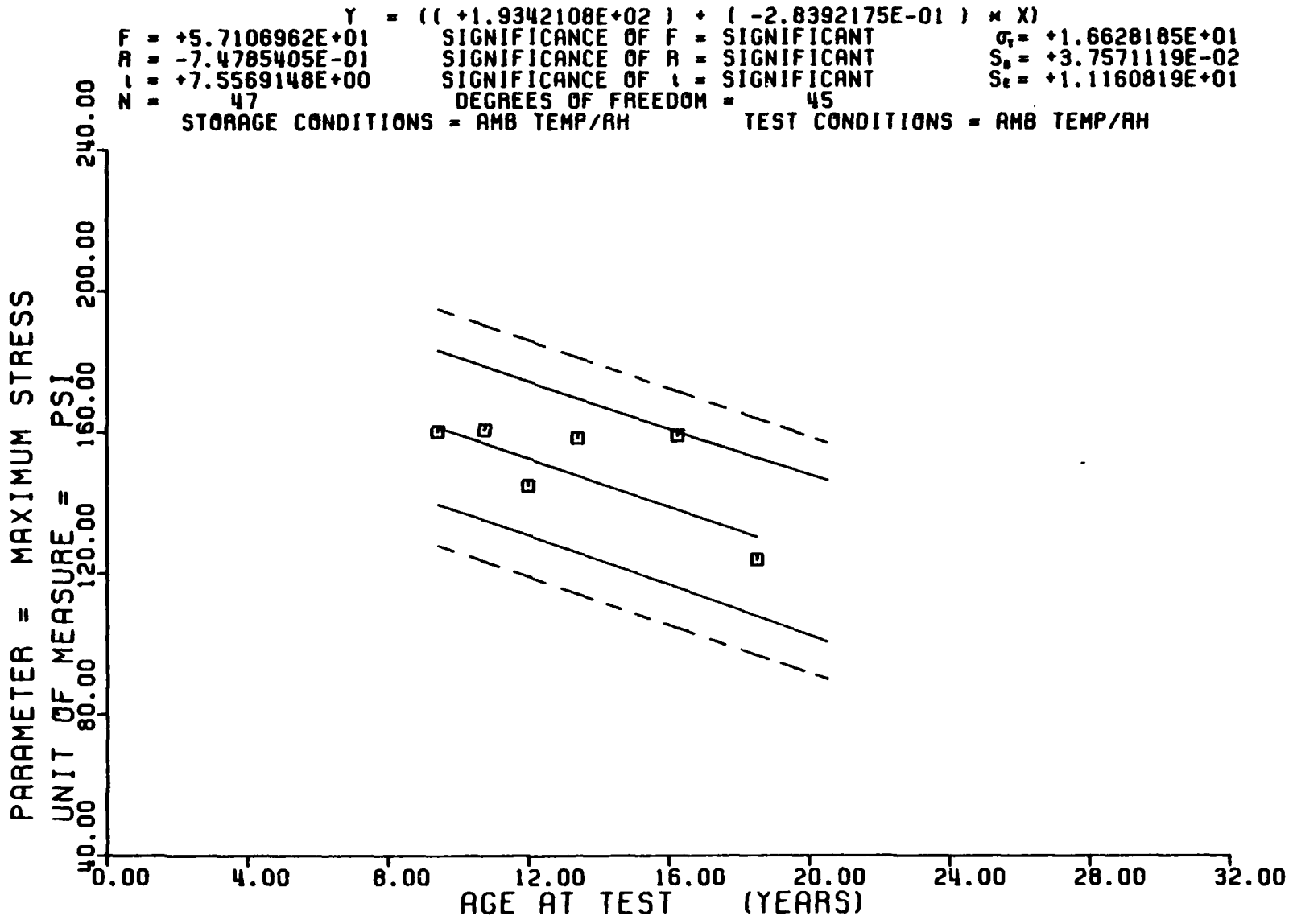

Y = ((+1.9342108E+02) + (-2.8392175E-01) * X)
F = +5.7106962E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = -7.4785405E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +7.5569148E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 47 DEGREES OF FREEDOM = 45
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σ1 = +1.6628185E+01
Sb = +3.7571119E-02
St = +1.1160819E+01
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
240.00
200.00
160.00
120.00
80.00
40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS ONLY, INNER,AXIAL POS.LOW RATE CHS=2.0 MAX STRESS <0022135>

Figure 42

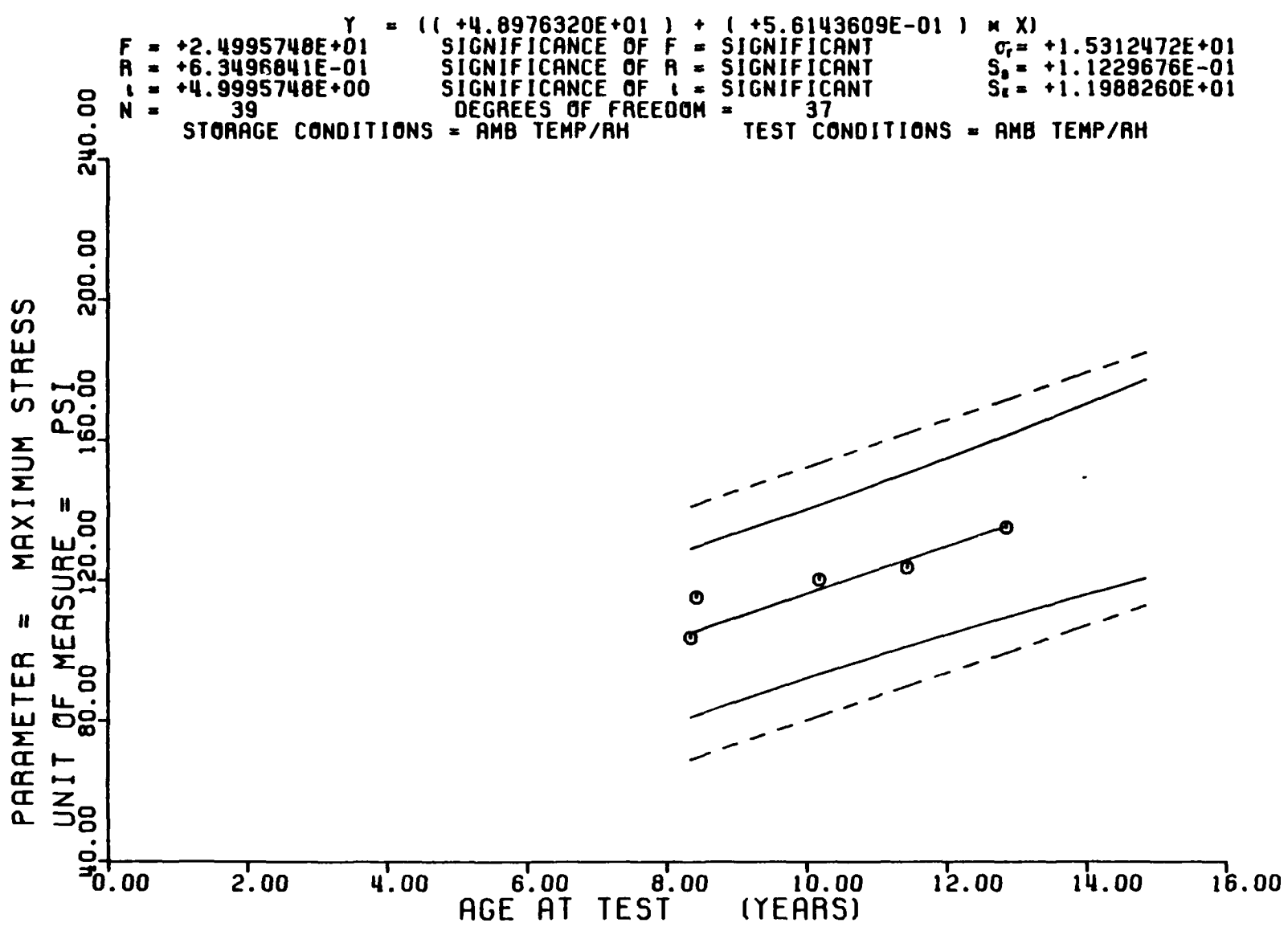

Y = ((+4.8976320E+01) + (+5.6143609E-01) * X)
F = +2.4995748E+01 SIGNIFICANCE OF F = SIGNIFICANT σr = +1.5312472E+01
R = +6.3496841E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.1229676E-01
t = +4.9995748E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +1.1988260E+01
N = 39 DEGREES OF FREEDOM = 37
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
240.00
200.00
160.00
120.00
80.00
40.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER,AXIAL POS.LOW RATE CHS=2.0 MAX STRESS <0022583>

Figure 43

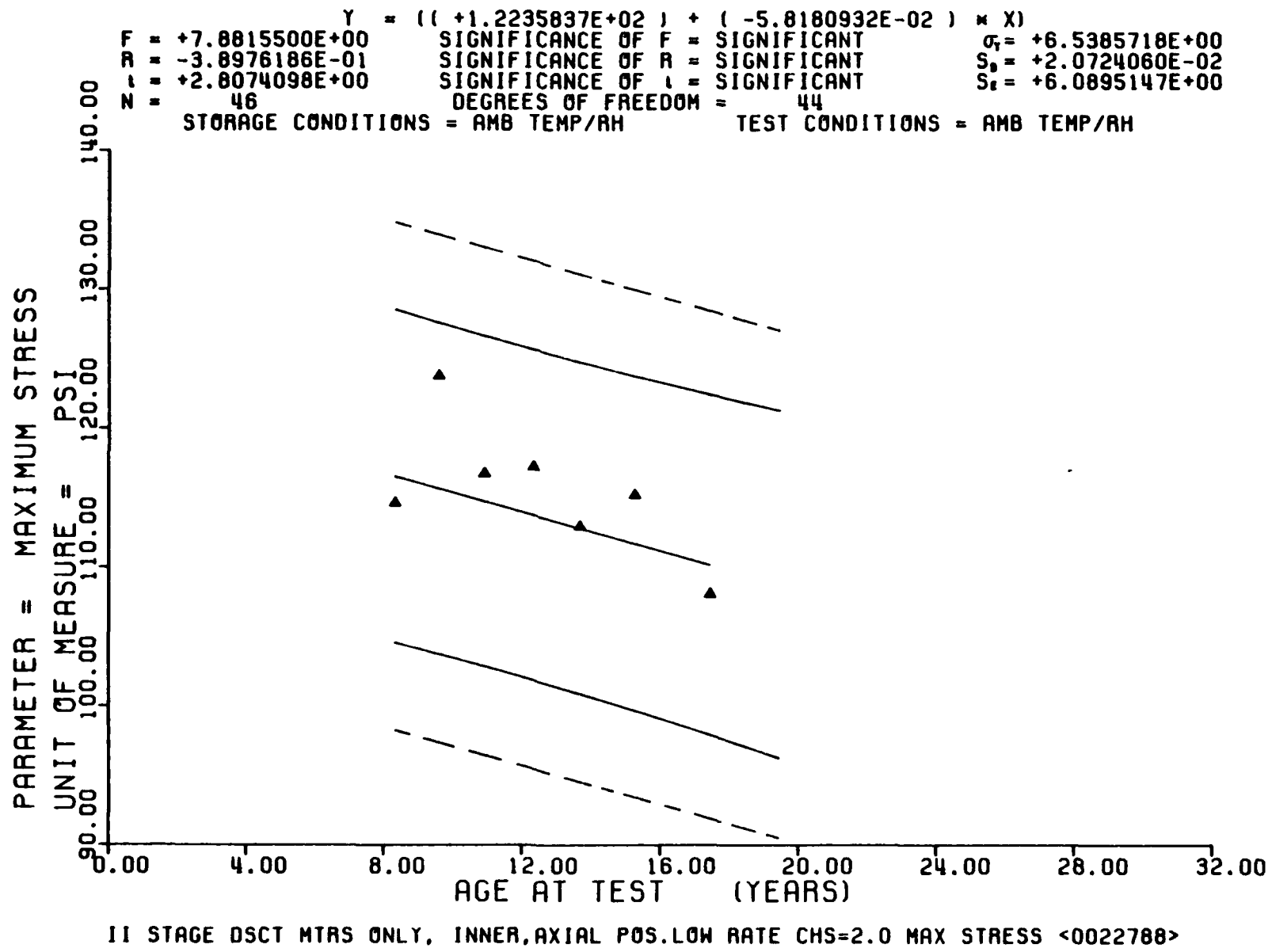

Y = ((+1.2235837E+02) + (-5.8180932E-02) * X)
F = +7.8815500E+00 SIGNIFICANCE OF F = SIGNIFICANT σr = +6.5385718E+00
R = -3.8976186E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +2.0724060E-02
ι = +2.8074098E+00 SIGNIFICANCE OF ι = SIGNIFICANT Se = +6.0895147E+00
N = 46 DEGREES OF FREEDOM = 44
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
140.00
130.00
120.00
110.00
100.00
90.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER,AXIAL POS.LOW RATE CHS=2.0 MAX STRESS <0022788>

Figure 44

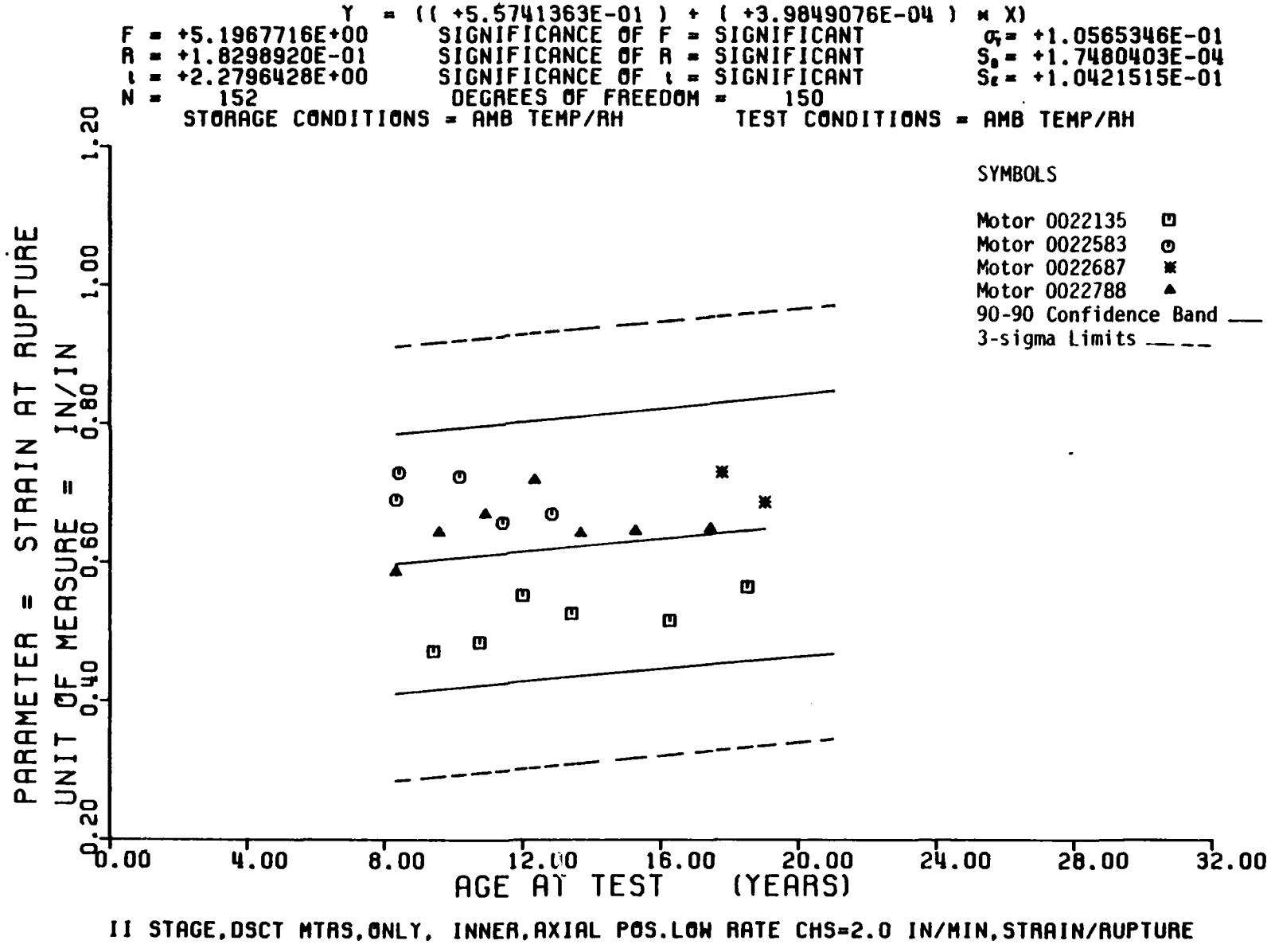

Y = ((+5.5741363E-01) + (+3.9849076E-04) * X)
F = +5.1967716E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +1.8298920E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.2796428E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 152 DEGREES OF FREEDOM = 150
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.20
0.40
0.60
0.80
1.00
1.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE,DSCT MTRS,ONLY, INNER,AXIAL POS.LOW RATE CHS=2.0 IN/MIN,STRAIN/RUPTURE

Figure 45

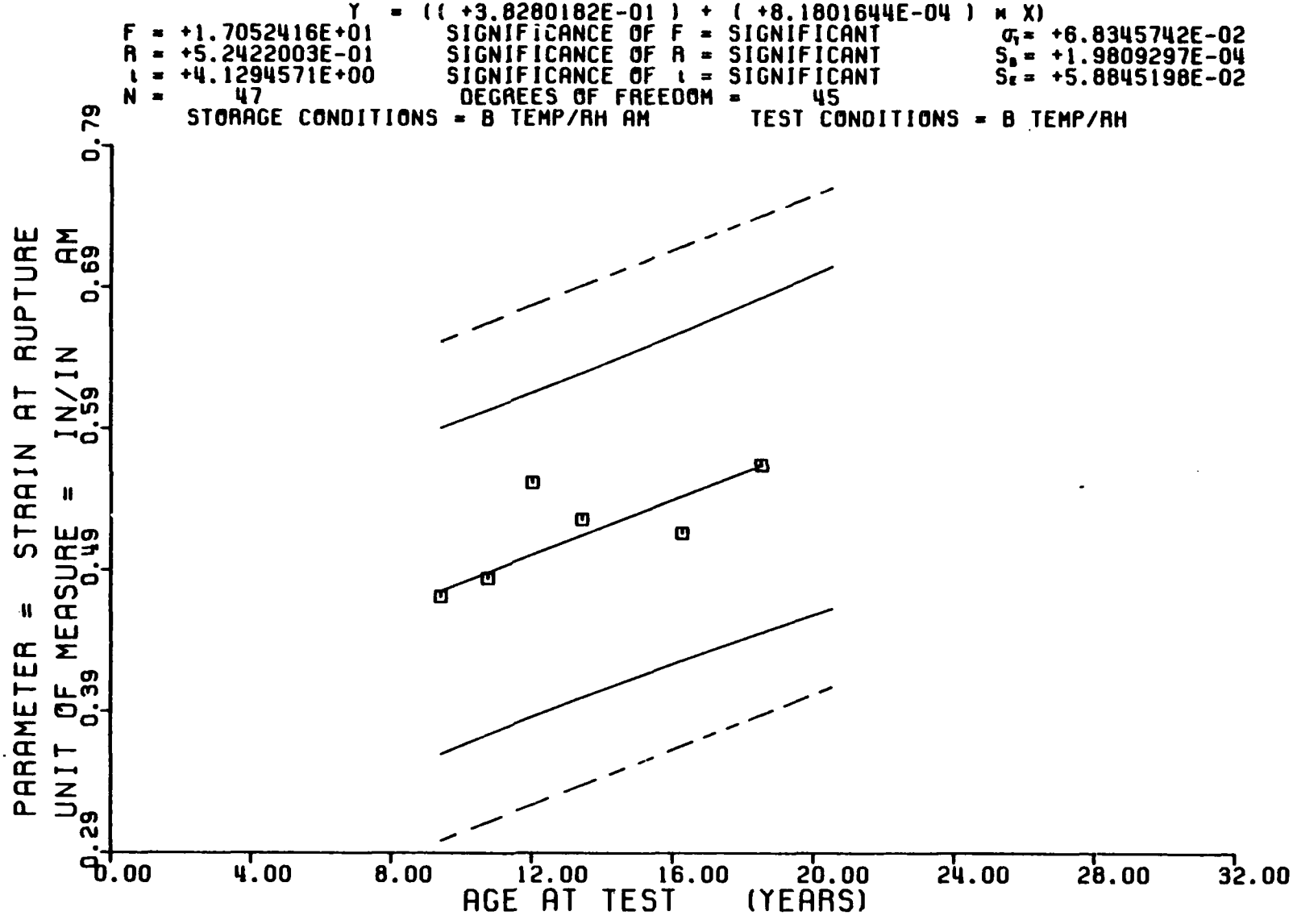

Y = ((+3.8280182E-01) + (+8.1801644E-04) * X)
F = +1.7052416E+01 SIGNIFICANCE OF F = SIGNIFICANT σ1 = +6.8345742E-02
R = +5.2422003E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.9809297E-04
t = +4.1294571E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +5.8845198E-02
N = 47 DEGREES OF FREEDOM = 45
STORAGE CONDITIONS = B TEMP/RH AM TEST CONDITIONS = B TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN AM
0.79
0.69
0.59
0.49
0.39
0.29
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER,AXIAL POS.LOW RATE CHS=2.0 STN RUPTUR <0022135>

Figure 46

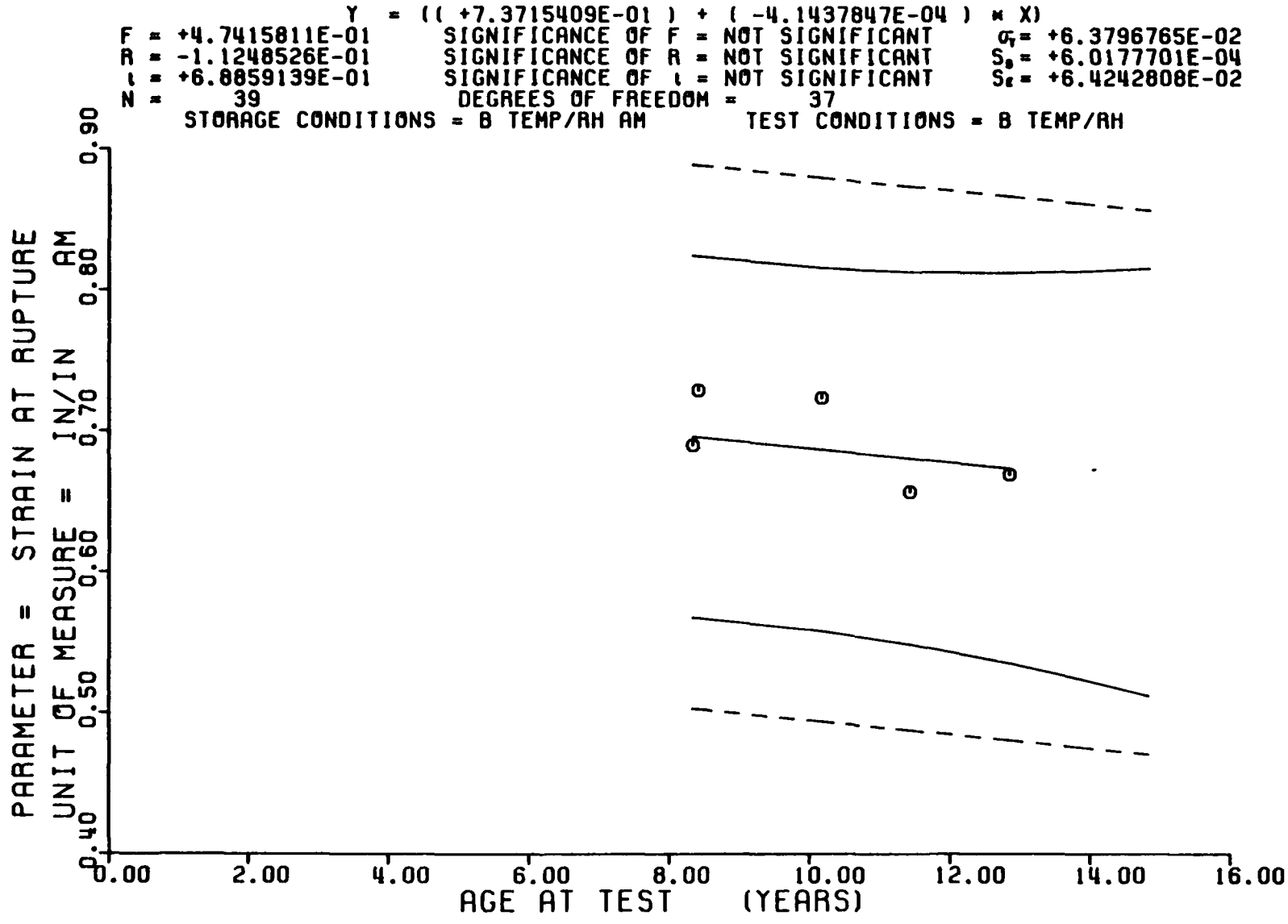

Y = ((+7.3715409E-01) + (-4.1437847E-04) * X)
F = +4.7415811E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +6.3796765E-02
R = -1.1248526E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +6.0177701E-04
t = +6.8859139E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +6.4242808E-02
N = 39 DEGREES OF FREEDOM = 37
STORAGE CONDITIONS = B TEMP/RH AM TEST CONDITIONS = B TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN AM
0.90
0.80
0.70
0.60
0.50
0.40
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER,AXIAL POS.LOW RATE CHS=2.0 STN RUPTUR <0022583>

Figure 47

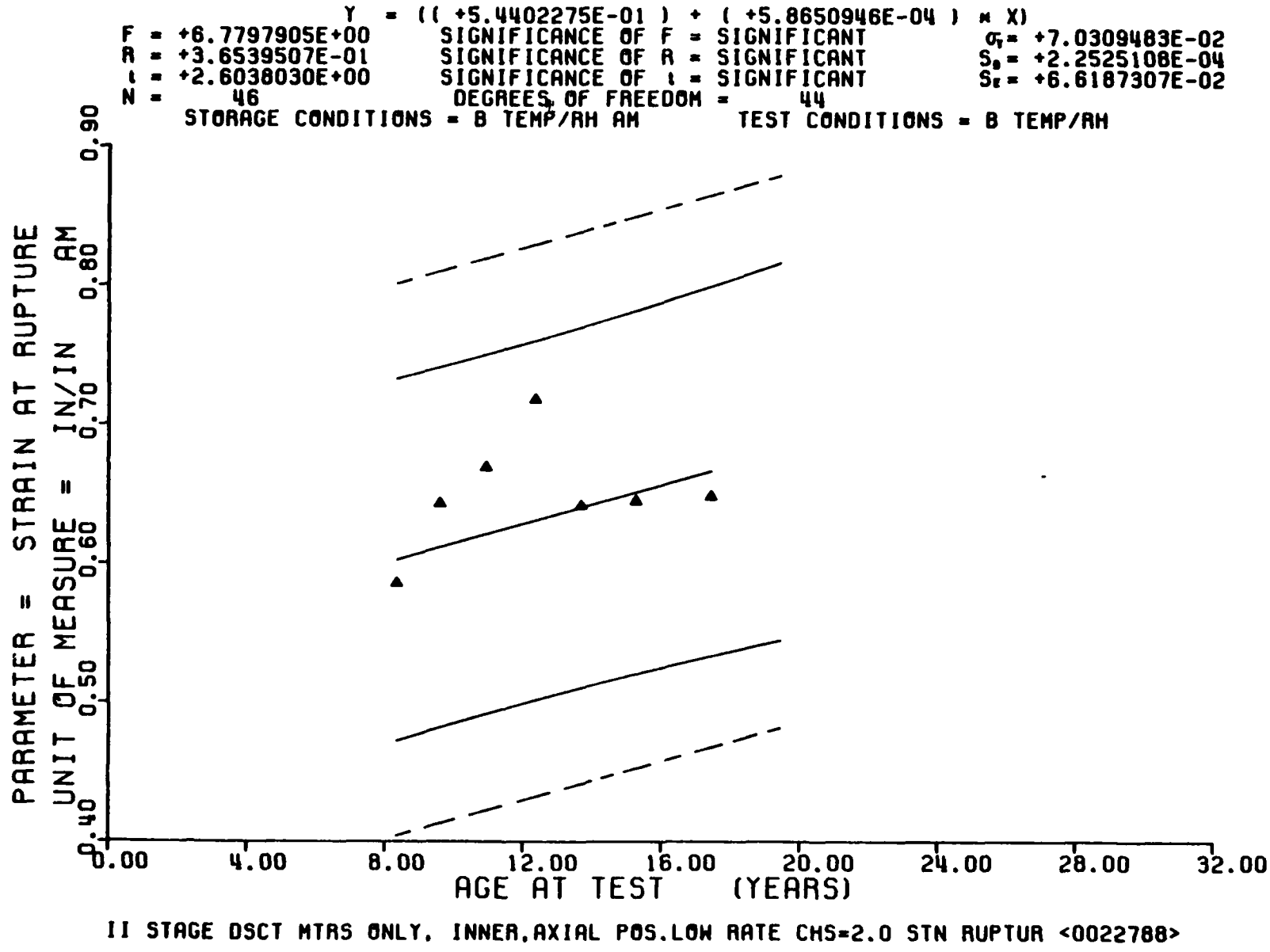

Y = ((+5.4402275E-01) + (+5.8650946E-04) * X)
F = +6.7797905E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +3.6539507E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.6038030E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 46 DEGREES OF FREEDOM = 44
STORAGE CONDITIONS = B TEMP/RH AM
TEST CONDITIONS = B TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN AM
0.40
0.50
0.60
0.70
0.80
0.90
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER,AXIAL POS.LOW RATE CHS=2.0 STN RUPTUR <0022788>

Figure 48

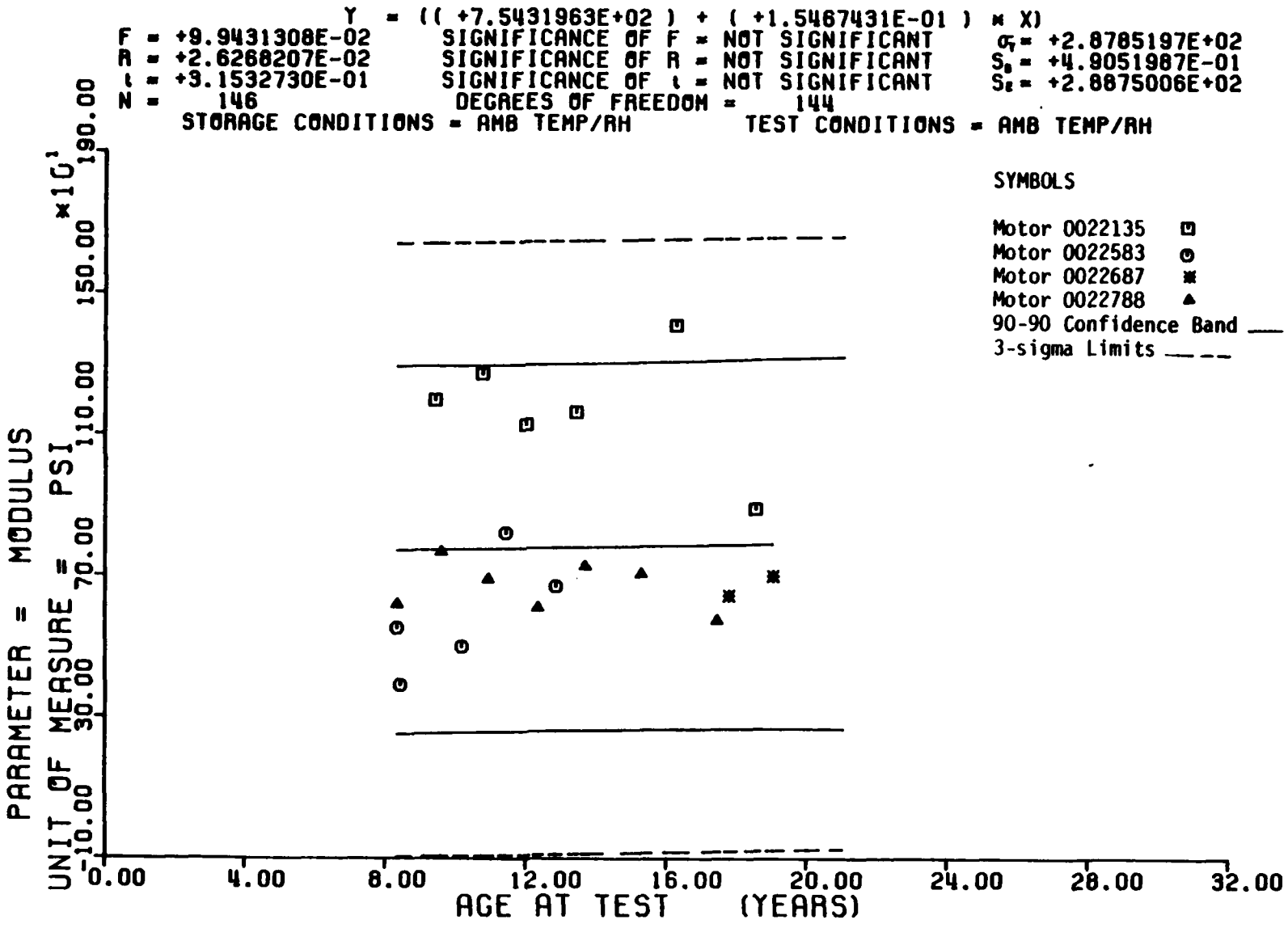

Y = ((+7.5431963E+02) + (+1.5467431E-01) * X)
F = +9.9431308E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +2.8785197E+02
R = +2.6268207E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +4.9051987E-01
t = +3.1532730E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +2.8875006E+02
N = 146 DEGREES OF FREEDOM = 144
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MODULUS
UNIT OF MEASURE = PSI *10¹
190.00
150.00
110.00
70.00
30.00
-10.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE,DSCT MTRS,ONLY, INNER,AXIAL POS.LOW RATE CHS=2.0 IN/MIN, MODULUS

Figure 49

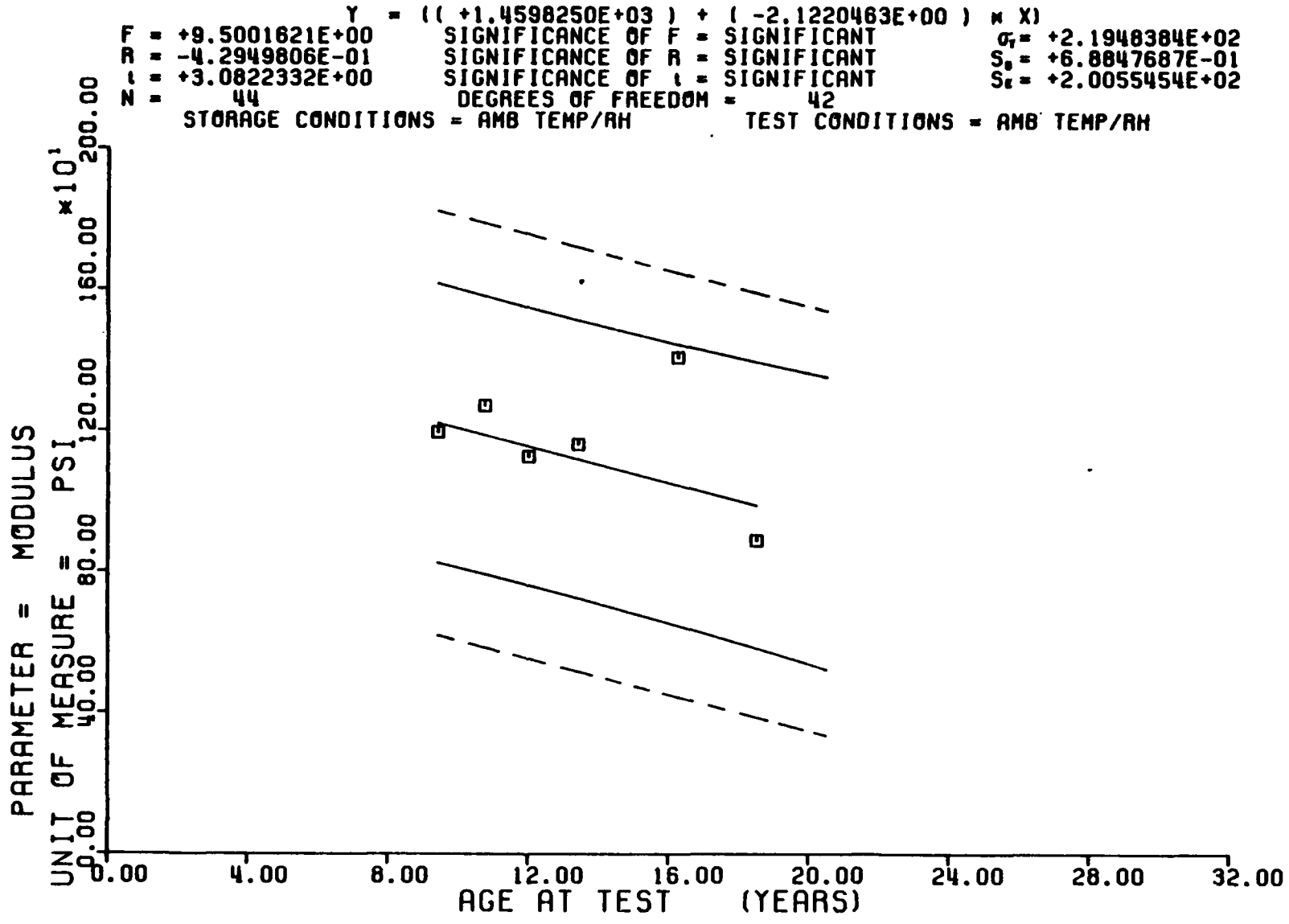
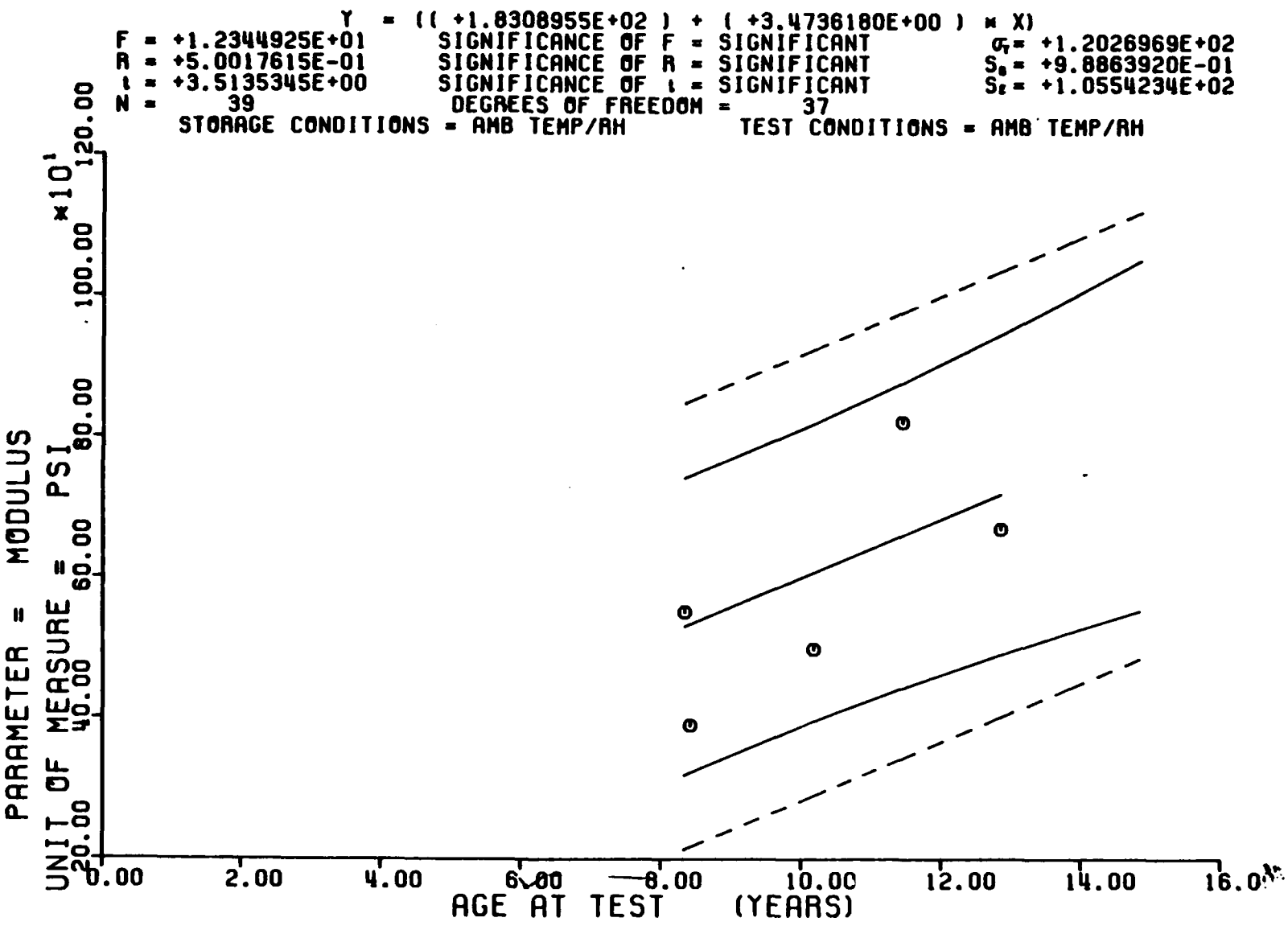

Y = ((+1.4598250E+03) + (-2.1220463E+00) * X)
F = +9.5001621E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = -4.2949806E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +3.0822332E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 44 DEGREES OF FREEDOM = 42
σ_t = +2.1948384E+02
S_e = +6.8847687E-01
S_t = +2.0055454E+02
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
*10¹
200.00
160.00
120.00
80.00
40.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, AXIAL POS. LOW RATE CHS=2.0 MODULUS <0022135>.

Figure 50



II STAGE DSCT MTRS ONLY, INNER, AXIAL POS. LOW RATE CHS=2.0 MODULUS <0022583>.

Figure 51

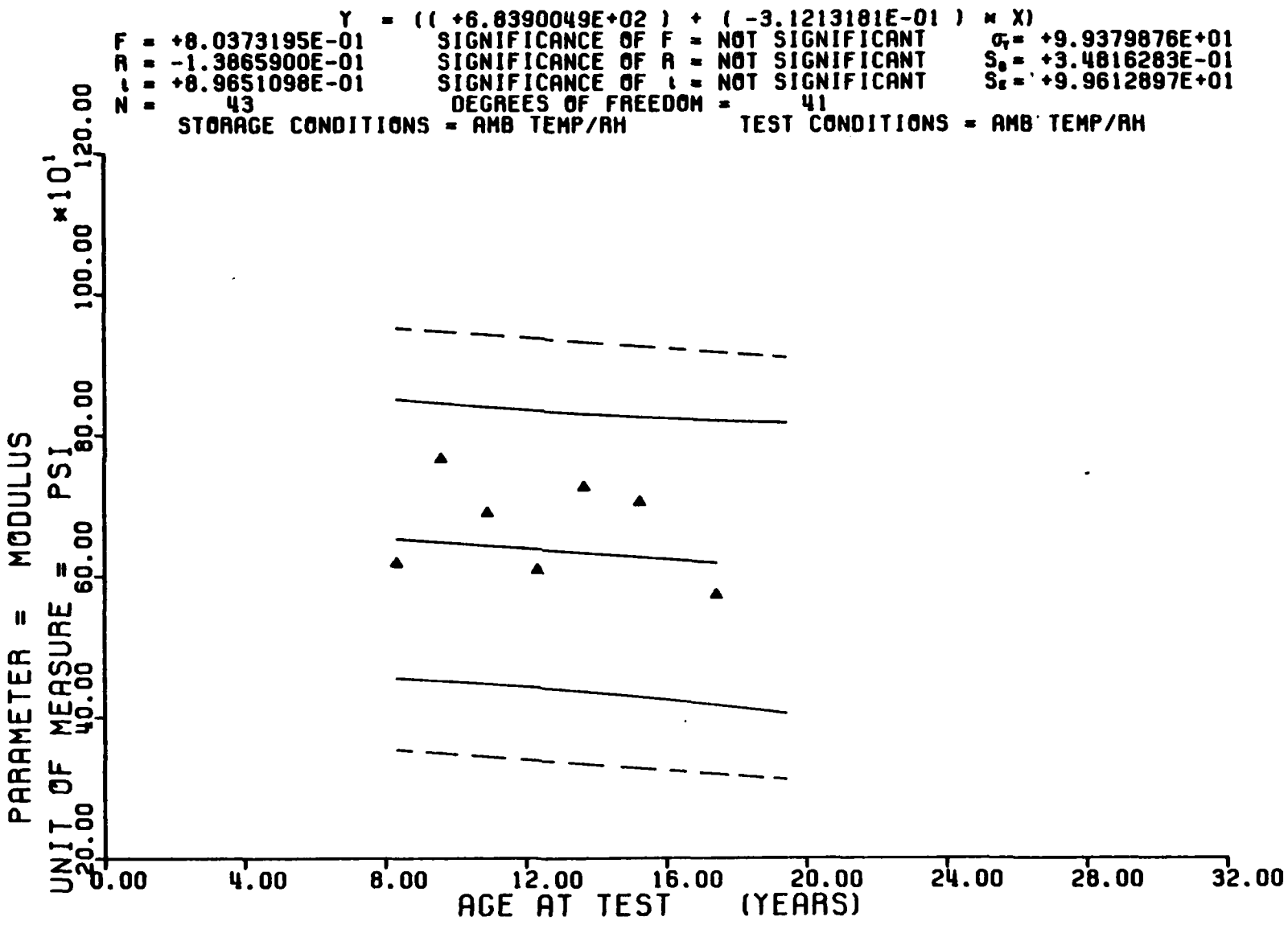
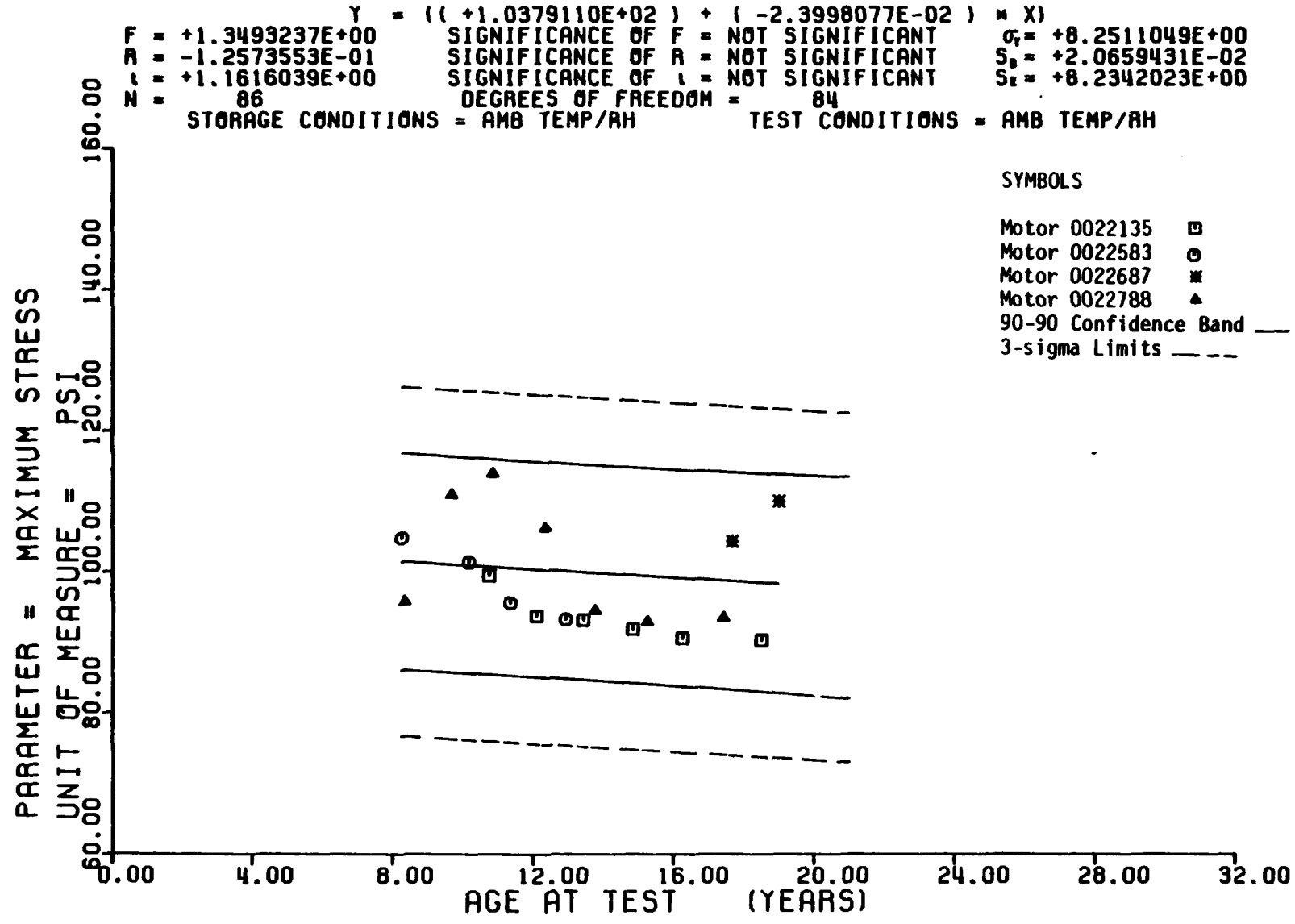

Y = ((+6.8390049E+02) + (-3.1213181E-01) * X)
F = +8.0373195E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σ_Y = +9.9379876E+01
R = -1.3865900E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT S_e = +3.4816283E-01
t = +8.9651098E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT S_x = +9.9612897E+01
N = 43 DEGREES OF FREEDOM = 41
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
*10^1
120.00
100.00
80.00
60.00
40.00
20.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS ONLY, INNER, AXIAL POS. LOW RATE CHS=2.0 MODULUS <0022788>.

Figure 52



II STAGE DSCT MTRS ONLY,OUTER,AXIAL POS.BIAXIAL CHS=0.2 IN/MIN,MAXIMUM STRESS

Figure 53

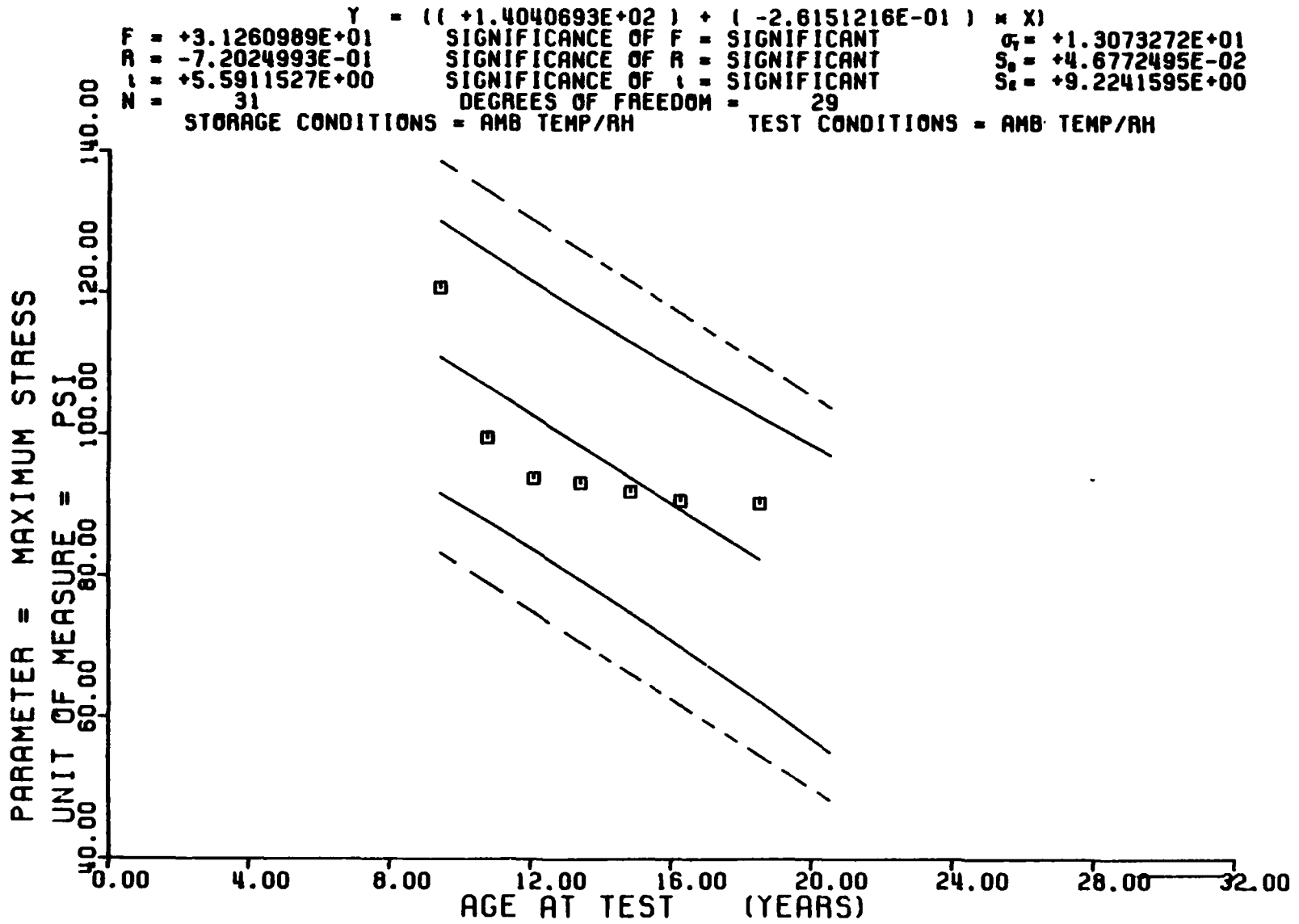

Y = ((+1.4040693E+02) + (-2.6151216E-01) * X)
F = +3.1260989E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = -7.2024993E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +5.5911527E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 31 DEGREES OF FREEDOM = 29
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
140.00
120.00
100.00
80.00
60.00
40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS ONLY,OUTER,AXIAL POS.BIAXIAL CHS=0.2 MAX STRESS <0022135>

Figure 54

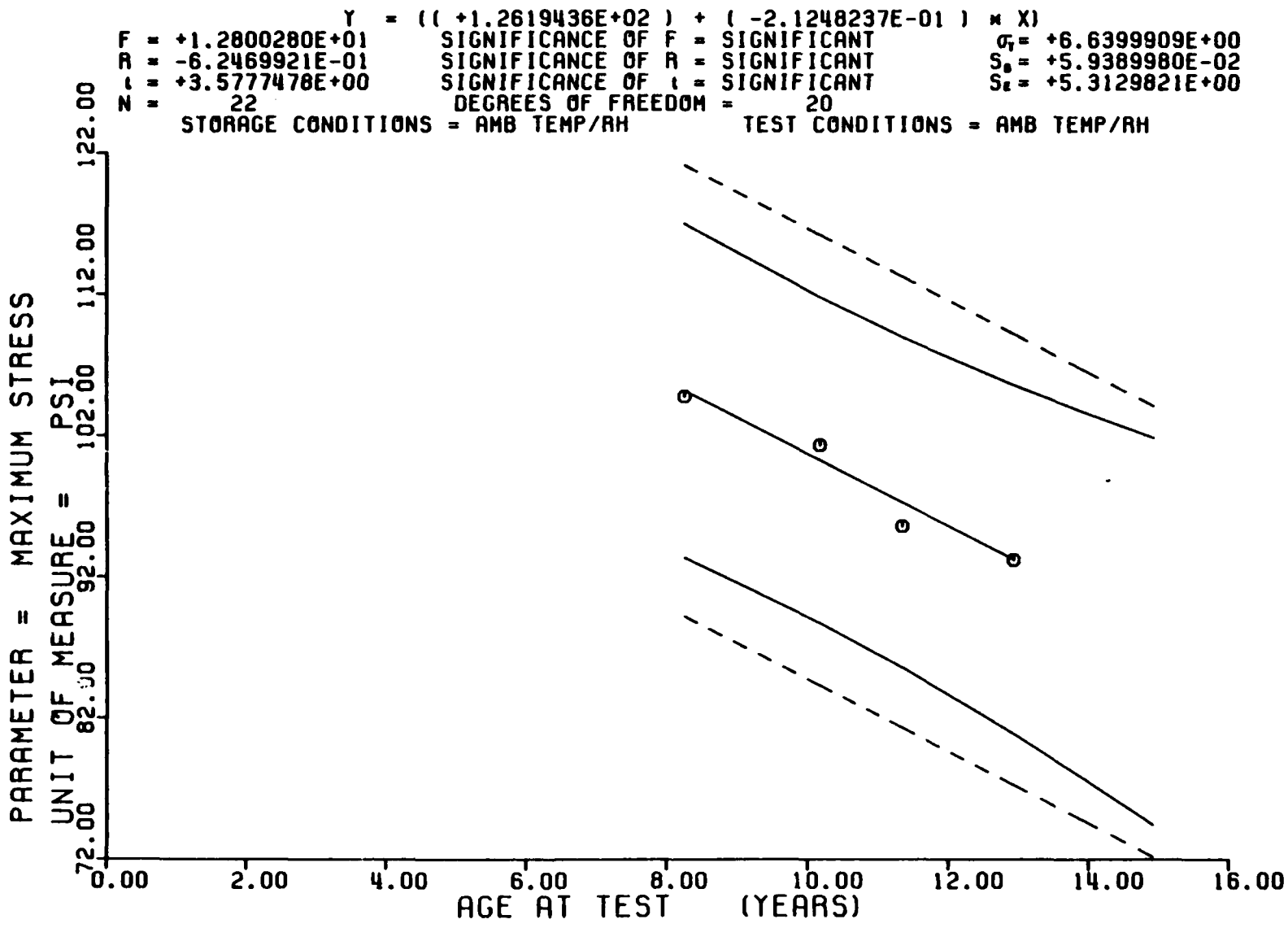

Y = ((+1.2619436E+02) + (-2.1248237E-01) * X)
F = +1.2800280E+01 SIGNIFICANCE OF F = SIGNIFICANT σT = +6.6399909E+00
R = -6.2469921E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +5.9389980E-02
t = +3.5777478E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +5.3129821E+00
N = 22 DEGREES OF FREEDOM = 20
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
122.00
112.00
102.00
92.00
82.00
72.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,AXIAL POS.BIAXIAL CHS=0.2 MAX STRESS <0022583>

Figure 55

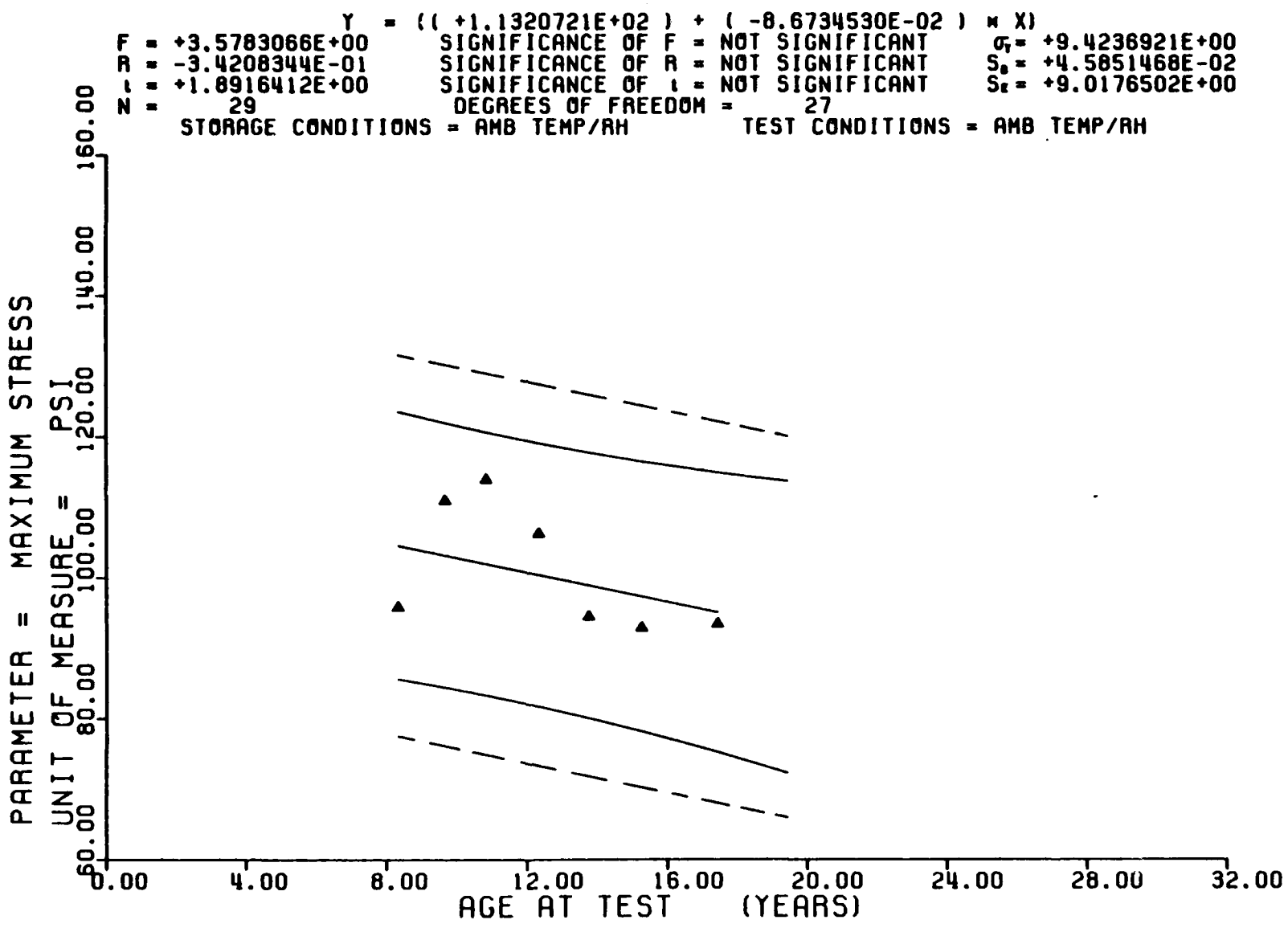

Y = ((+1.1320721E+02) + (-8.6734530E-02) * X)
F = +3.5783066E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +9.4236921E+00
R = -3.4208344E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Se = +4.5851468E-02
t = +1.8916412E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT St = +9.0176502E+00
N = 29 DEGREES OF FREEDOM = 27
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
160.00
140.00
120.00
100.00
80.00
60.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,AXIAL POS.BIAXIAL CHS=0.2 MAX STRESS <0022788>

Figure 56

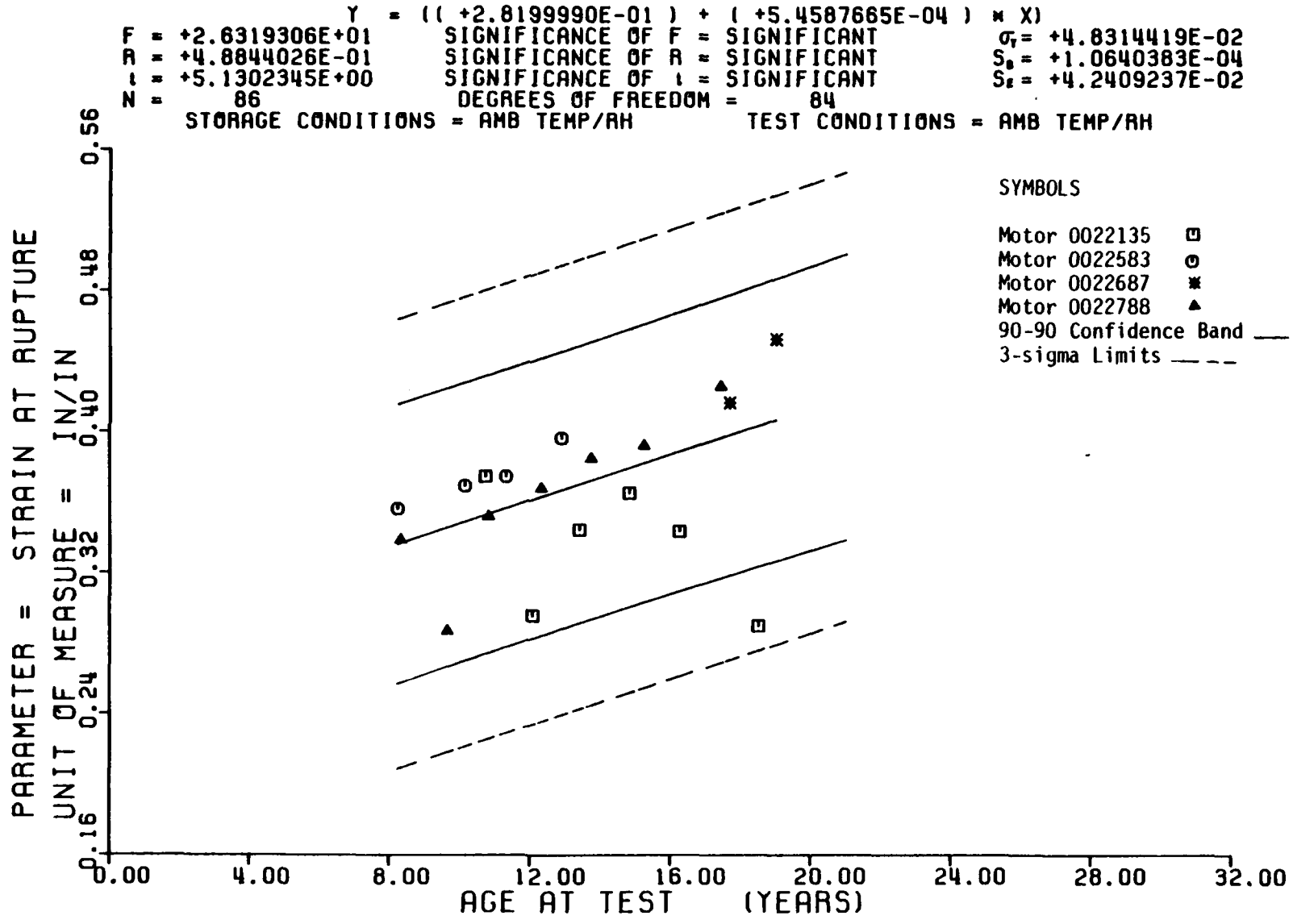

Y = ((+2.8199990E-01) + (+5.4587665E-04) * X)
F = +2.6319306E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +4.8844026E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +5.1302345E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 86 DEGREES OF FREEDOM = 84
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σT = +4.8314419E-02
Sb = +1.0640383E-04
Sε = +4.2409237E-02
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.16
0.24
0.32
0.40
0.48
0.56
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,AXIAL POS.BIAXIAL CHS=0.2 IN/MIN,STRAIN/RUPTURE

Figure 57

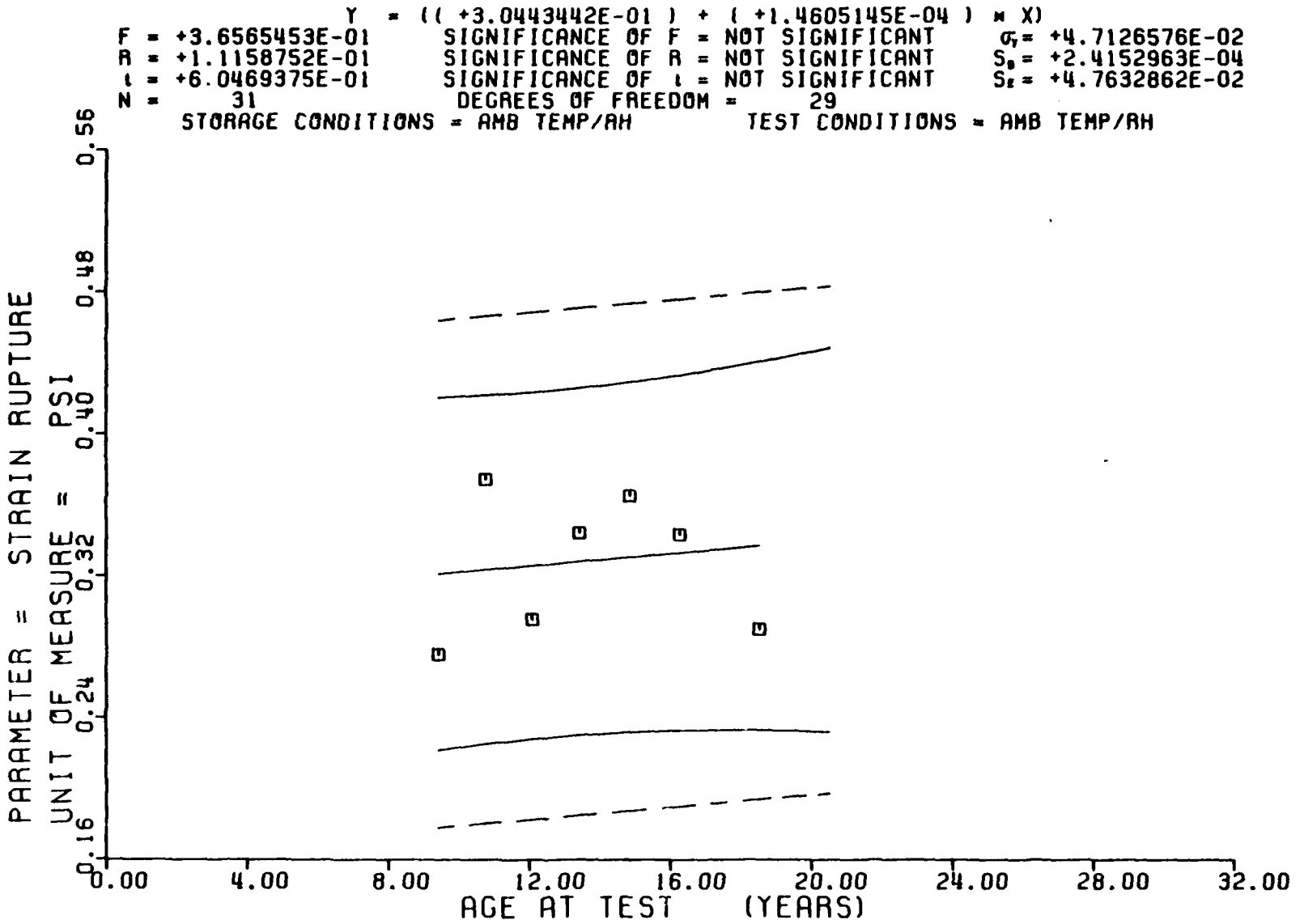
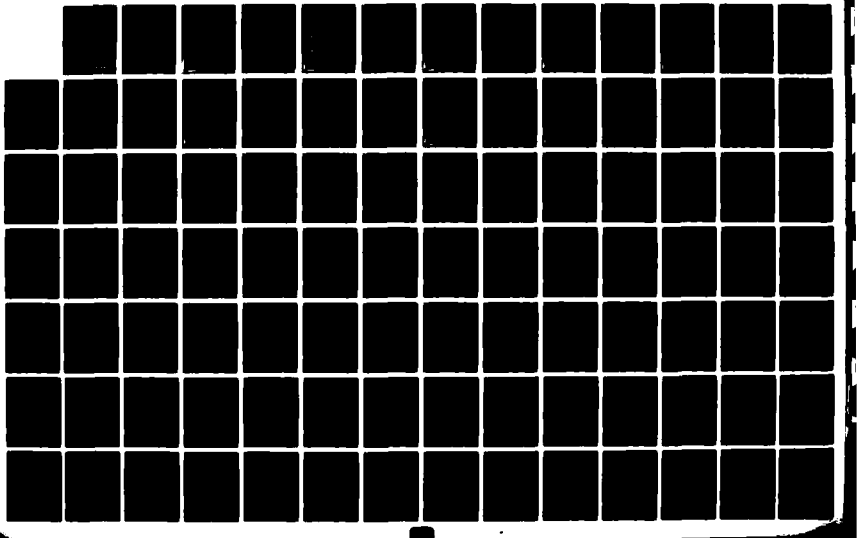
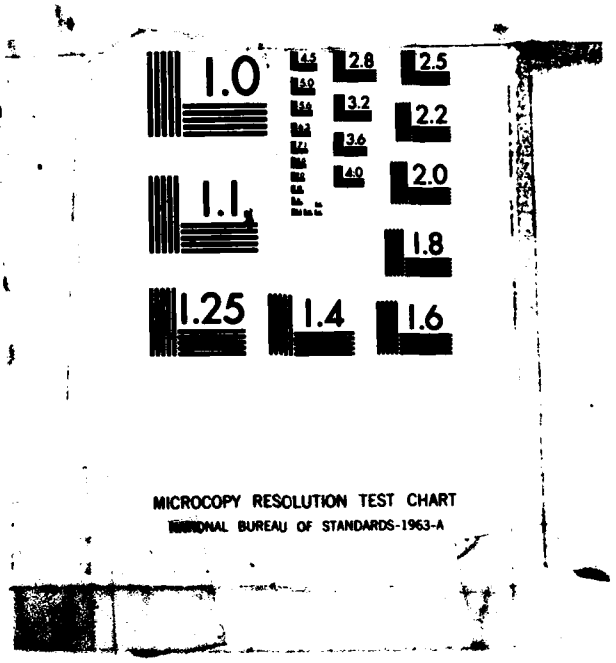

Y = ((+3.0443442E-01) + (+1.4605145E-04) * X)
F = +3.6565453E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σY = +4.7126576E-02
R = +1.1158752E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +2.4152963E-04
ι = +6.0469375E-01 SIGNIFICANCE OF ι = NOT SIGNIFICANT Sε = +4.7632862E-02
N = 31 DEGREES OF FREEDOM = 29
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.16
0.24
0.32
0.40
0.48
0.56
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,AXIAL POS.BIAXIAL CHS=0.2 STN RUPTUR <0022135>

Figure 58

AD-A140 337 LGM-30B STAGE II DISSECTED MOTOR TEST REPORT(U) OGDEN AIR LOGISTICS CENTER HILL AFB UT PROPELLANT ANALYSIS LAB E M DALABA FEB 84 MANPA-496(84) 2/3

UNCLASSIFIED F/G 21/8.2 NL





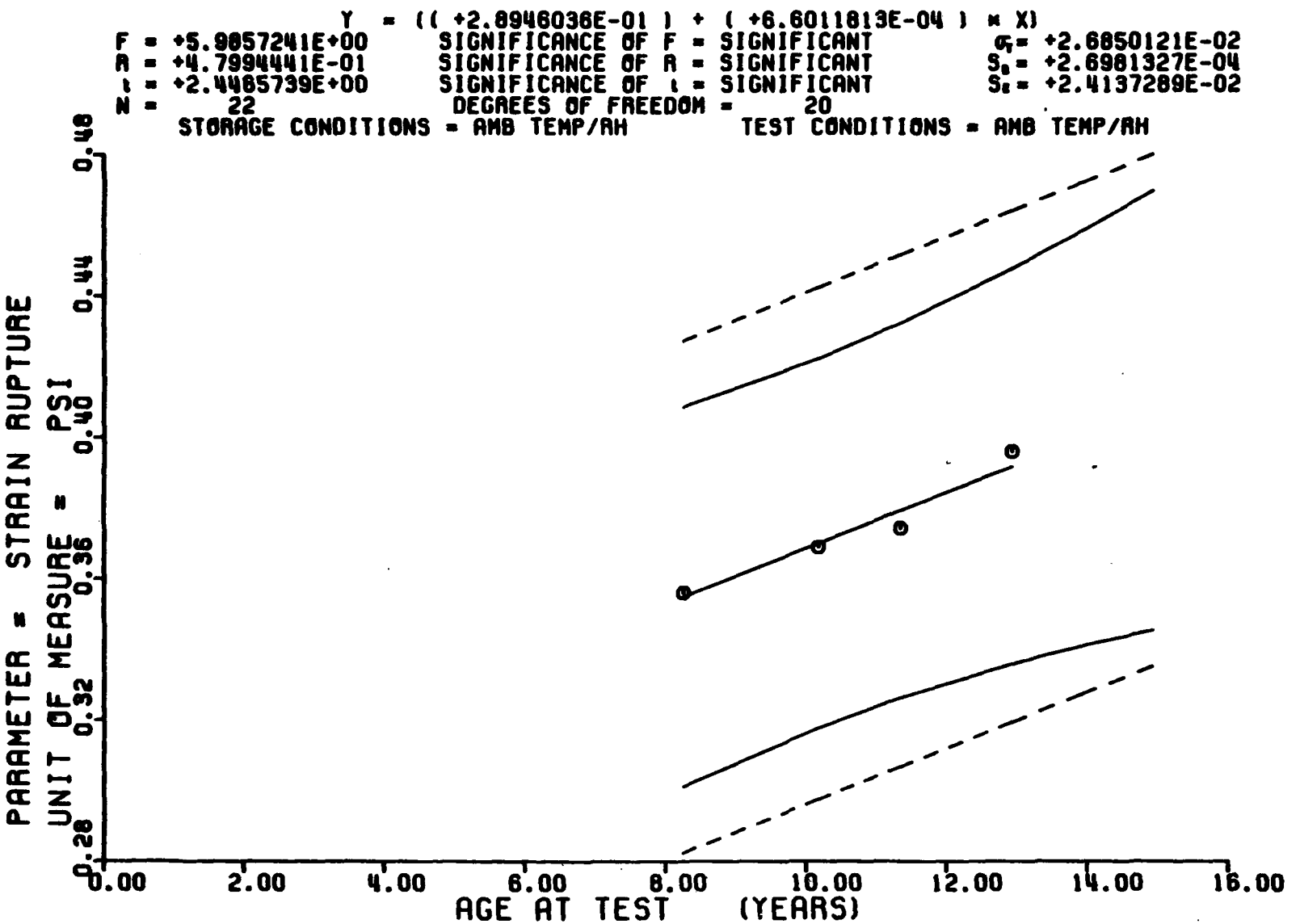

Y = ((+2.8946036E-01) + (+6.6011813E-04) * X)
F = +5.9857241E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +4.7994441E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.4485739E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 22 DEGREES OF FREEDOM = 20
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.48
0.44
0.40
0.36
0.32
0.28
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,AXIAL POS.BIAXIAL CHS=0.2 STN RUPTUR <0022583>

Figure 59

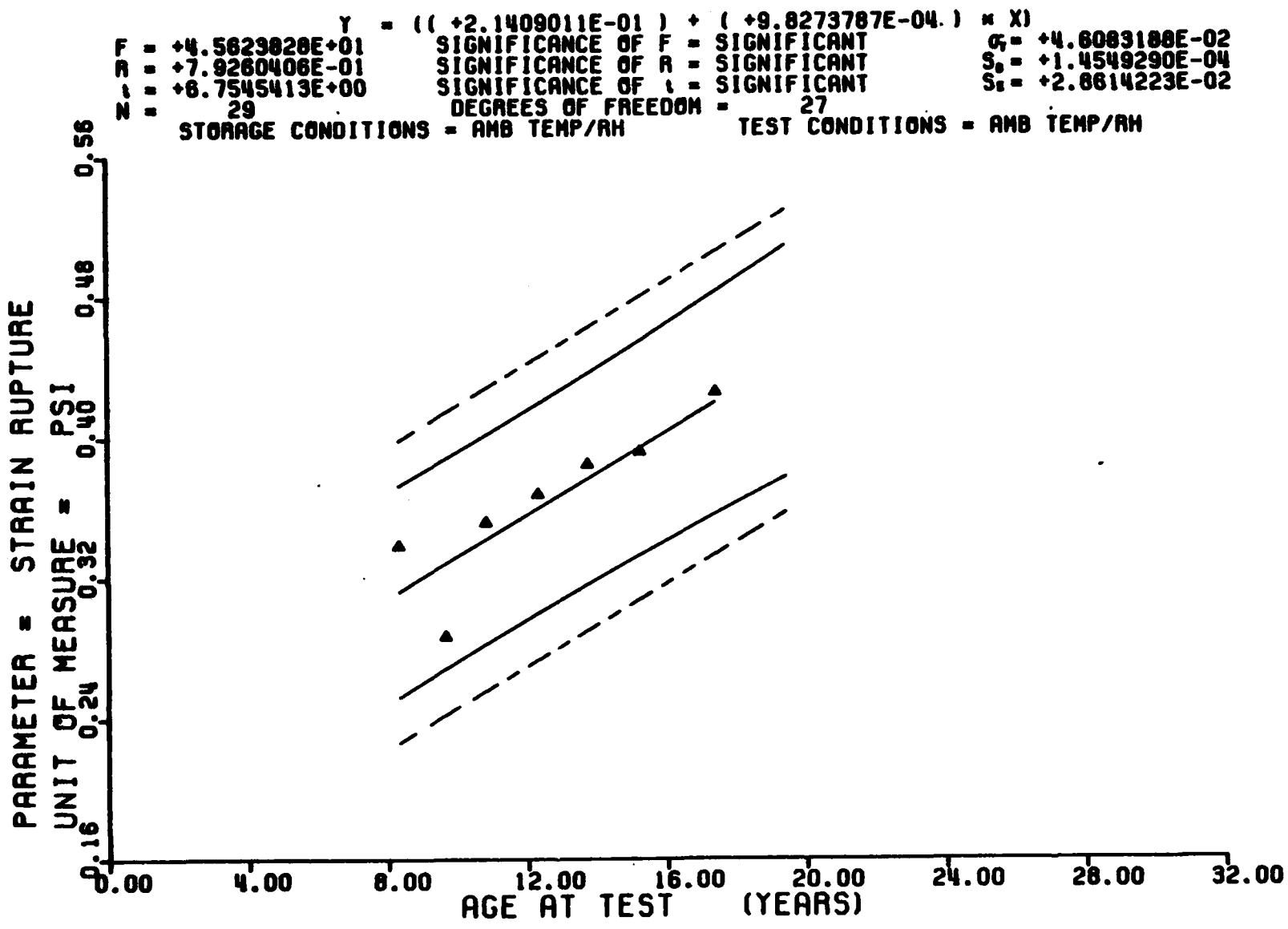
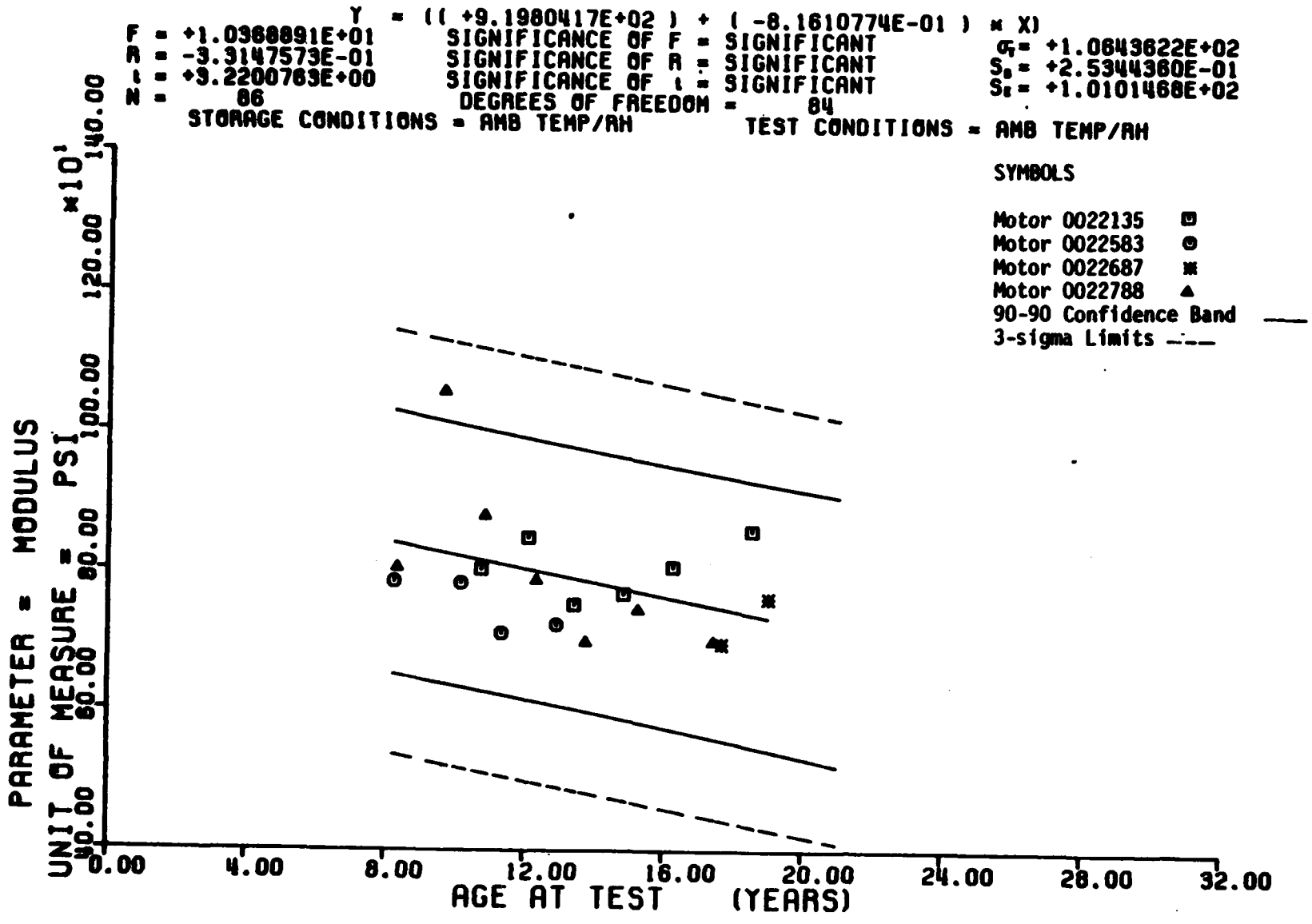

Y = ((+2.1409011E-01) + (+9.8273787E-04.) x X)
F = +4.5623828E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +7.9260406E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +6.7545413E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 29 DEGREES OF FREEDOM = 27
σ_r = +4.6083188E-02
S_b = +1.4549290E-04
S_t = +2.8614223E-02
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.16
0.24
0.32
0.40
0.48
0.56
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,AXIAL POS.BIAXIAL CHS=0.2 STN RUPTUR <0022788>

Figure 60



II STAGE DSCT MTRS ONLY, OUTER, AXIAL POS. BIAXIAL CHS=0.2 IN/MIN, MODULUS

Figure 61

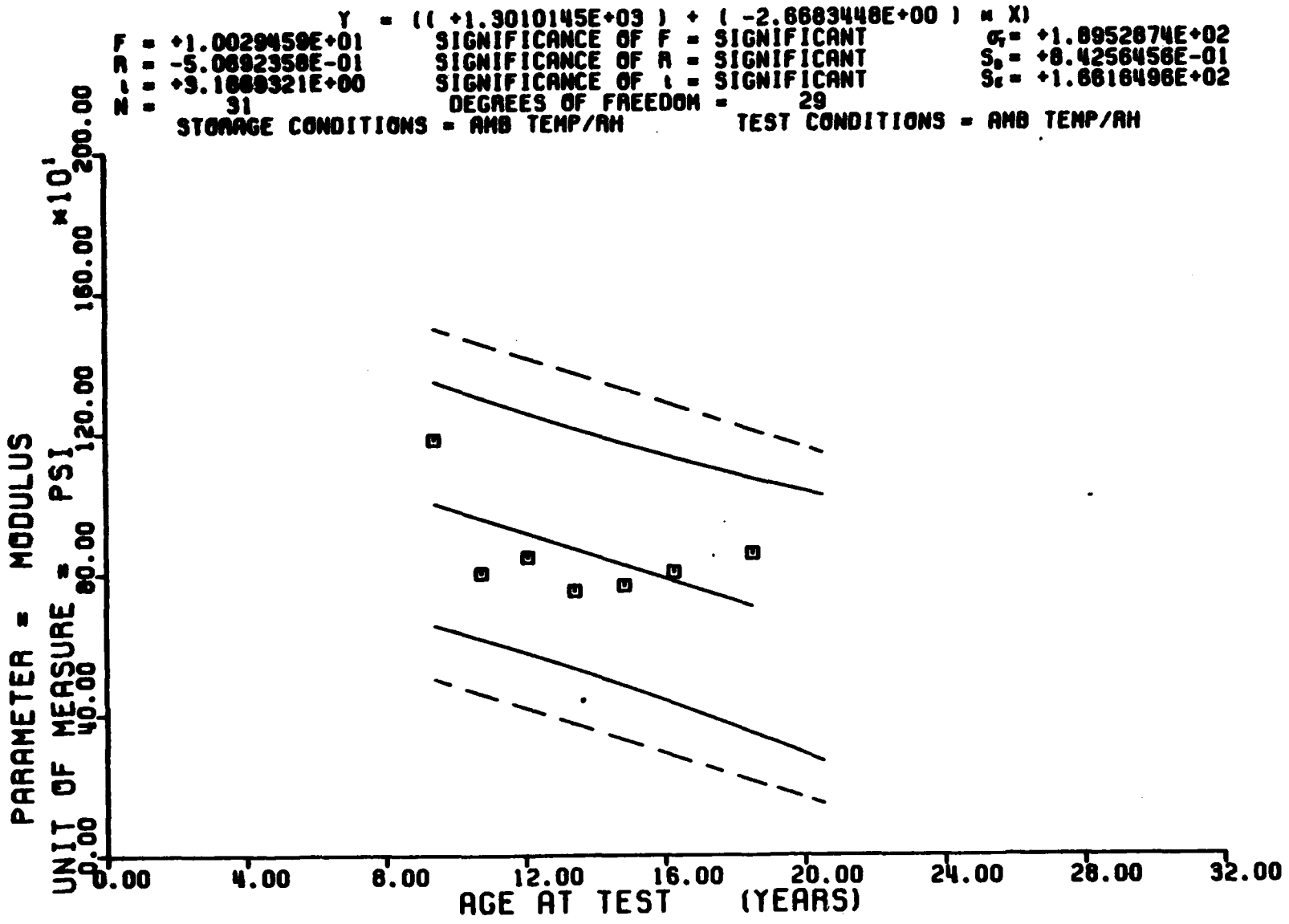

Y = ((+1.3010145E+03) + (-2.6683448E+00) * X)
F = +1.0029459E+01 SIGNIFICANCE OF F = SIGNIFICANT σr = +1.8952874E+02
R = -5.0892358E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +8.4256456E-01
t = +3.1669321E+00 SIGNIFICANCE OF t = SIGNIFICANT St = +1.6616496E+02
N = 31 DEGREES OF FREEDOM = 29
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
*10¹
0.00
40.00
80.00
120.00
160.00
200.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,AXIAL POS.BIAXIAL CHS=0.2 MODULUS <0022135>

Figure 62

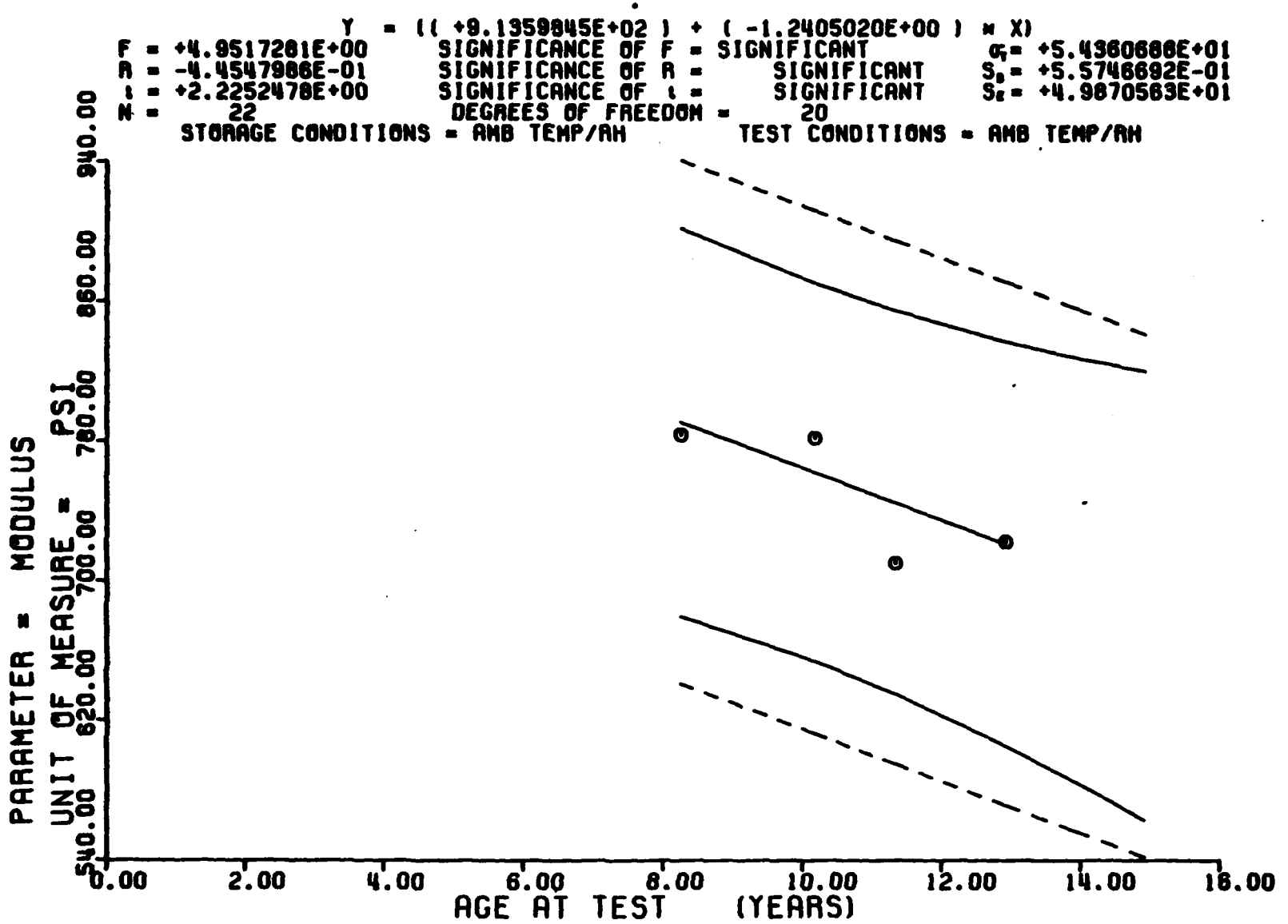

Y = ((+9.1359845E+02) + (-1.2405020E+00) * X)
F = +4.9517281E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = -4.4547986E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.2252478E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 22 DEGREES OF FREEDOM = 20
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
940.00
860.00
780.00
700.00
620.00
540.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,AXIAL POS.BIAXIAL CHS=0.2 MODULUS <0022583>

Figure 63

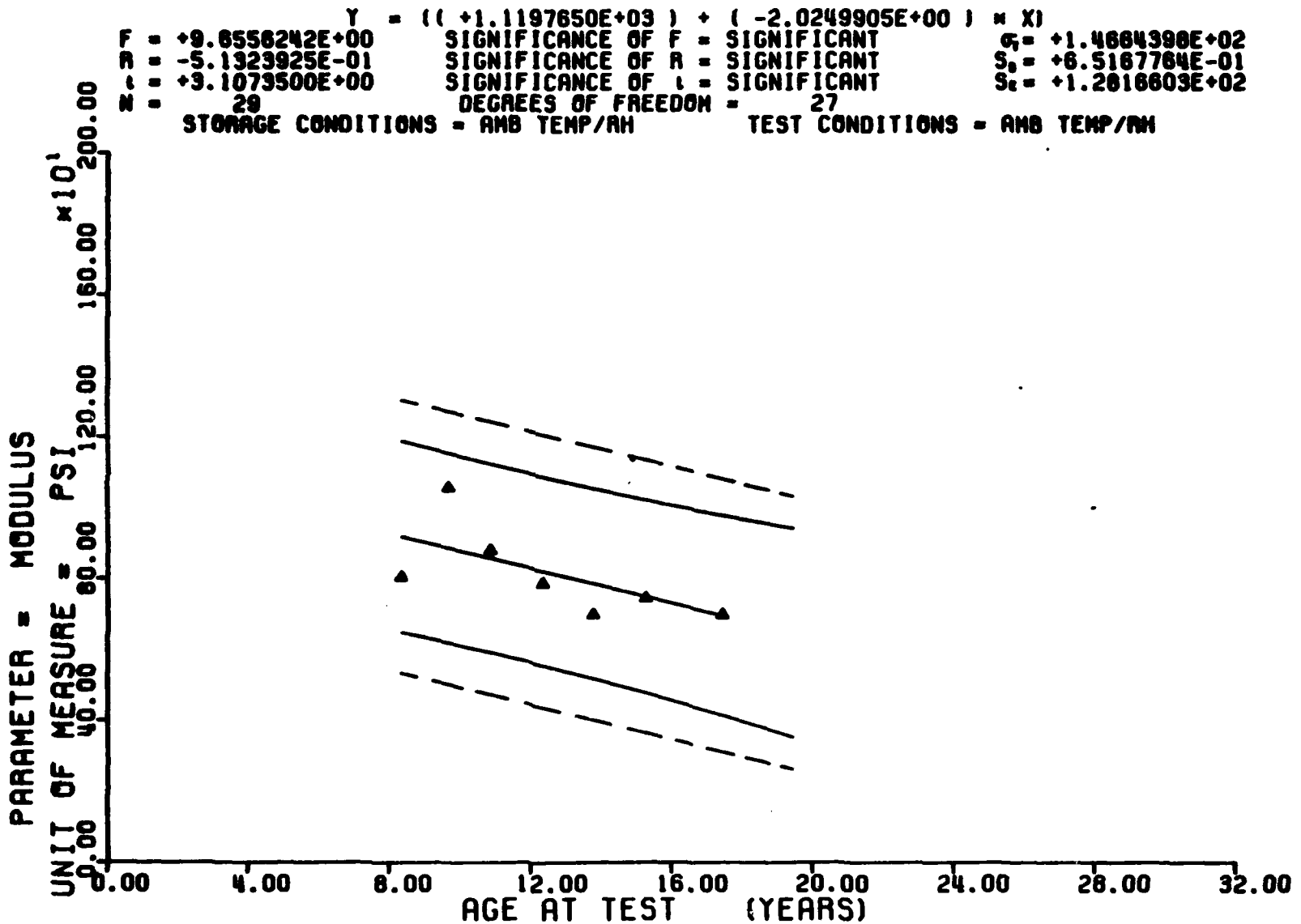
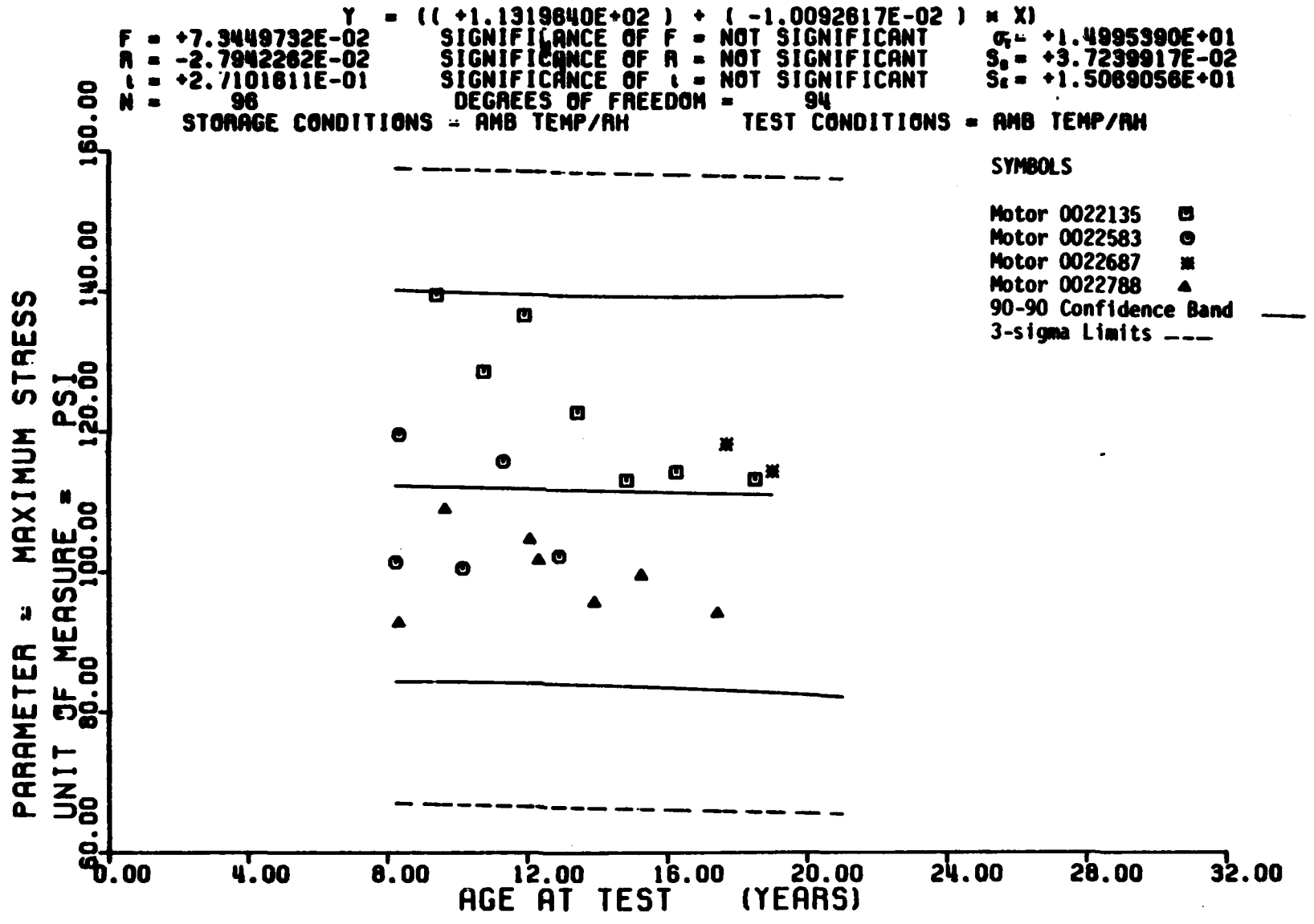
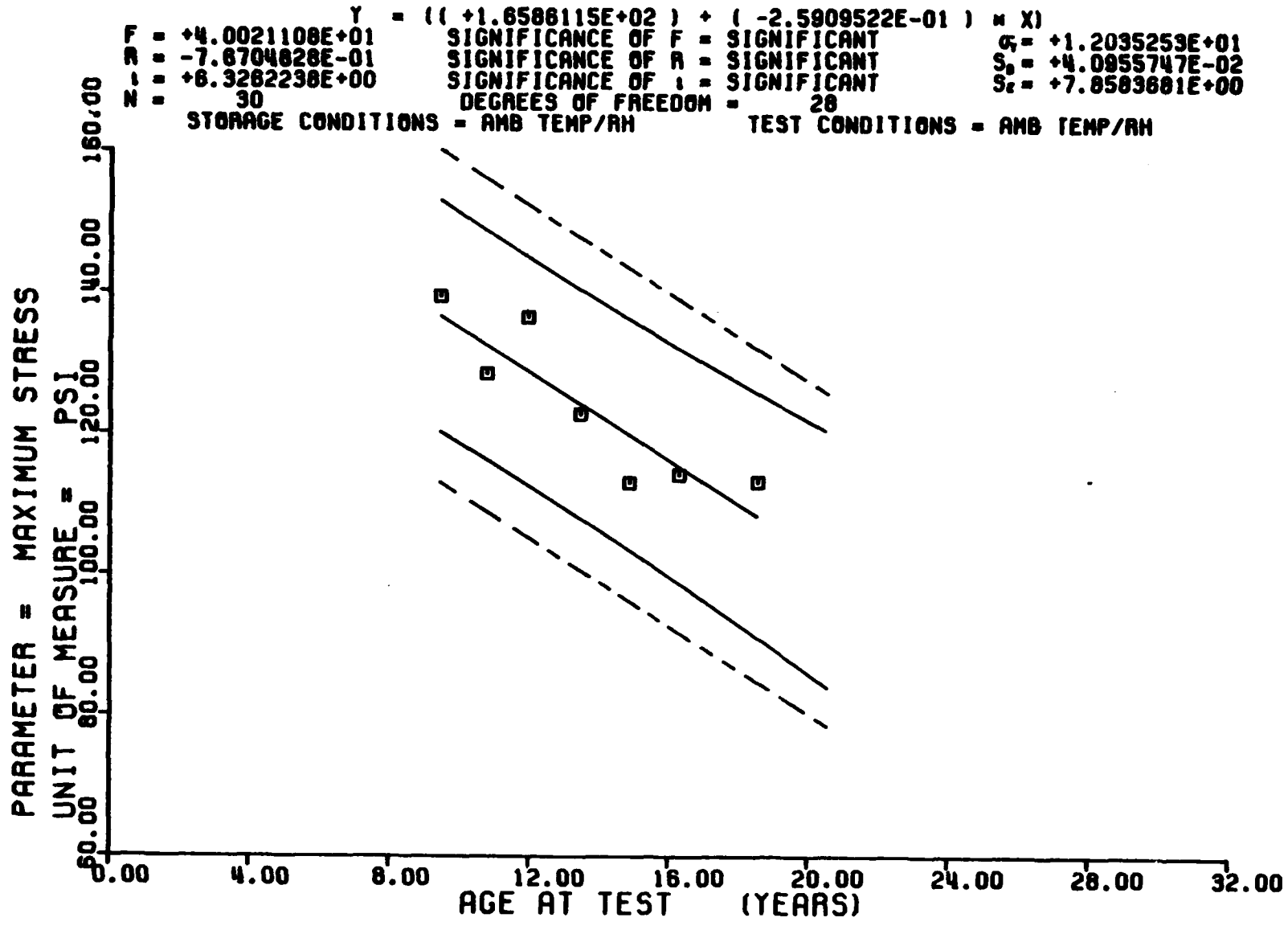

Y = ((+1.1197650E+03) + (-2.0249905E+00) * X)
F = +9.6556242E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = -5.1923925E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +3.1079500E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 29 DEGREES OF FREEDOM = 27
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI x10^1
0.00
40.00
80.00
120.00
160.00
200.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER, AXIAL POS. BIAXIAL CHS=0.2 MODULUS <0022788>

Figure 64



STAGE II DISSECTED MIAS, INNER, AXIAL POS. BIAXIAL CHS=0.2 IN/MIN, MAX STRESS

Figure 65



II STAGE OSCT MTRS ONLY, INNER,AXIAL POS.LOW RATE CHS=0.2 MAX STRESS <0022135>.

Figure 66

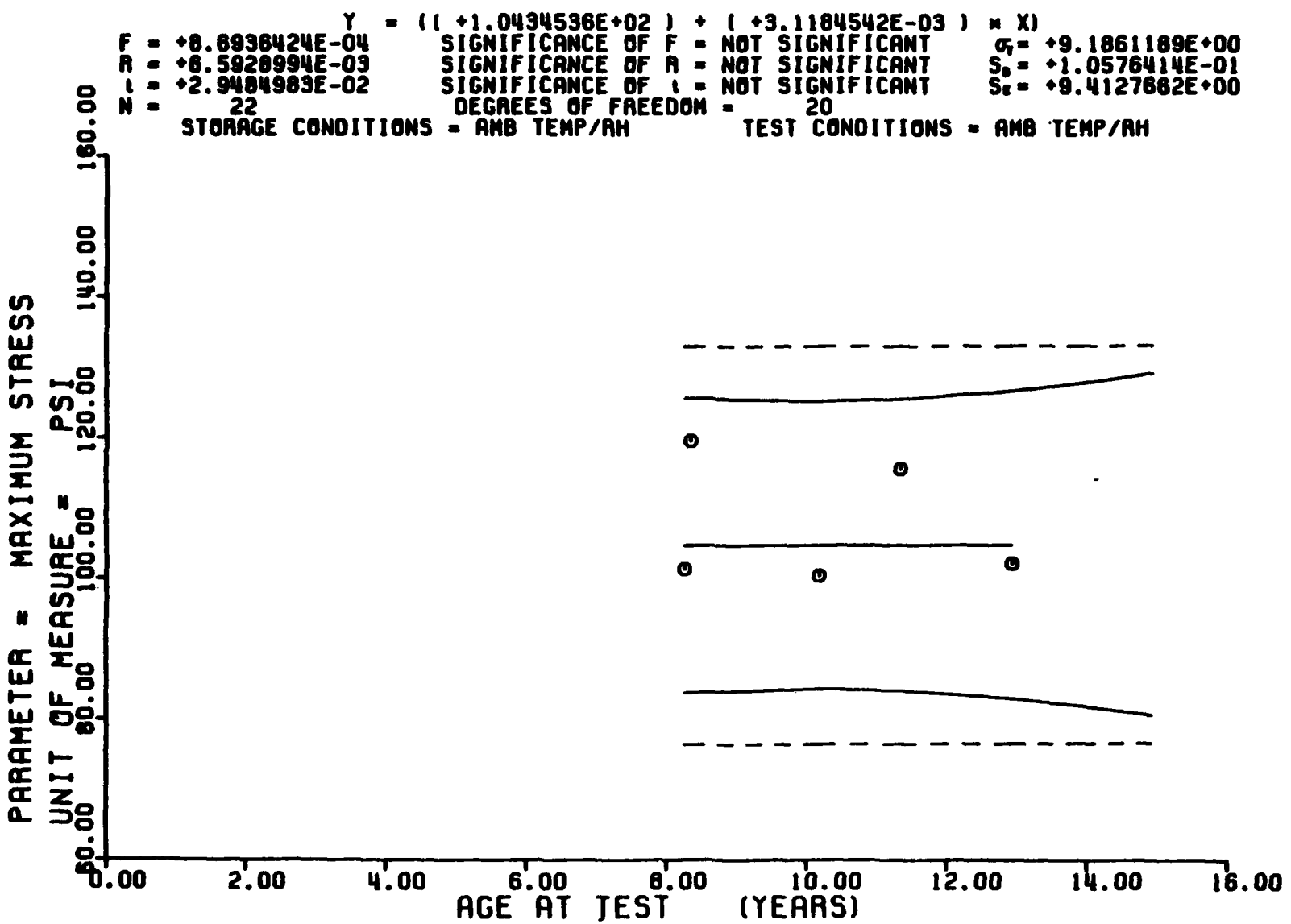

Y = ((+1.0434536E+02) + (+3.1184542E-03) x X)
F = +8.6936424E-04 SIGNIFICANCE OF F = NOT SIGNIFICANT
R = +6.5928994E-03 SIGNIFICANCE OF R = NOT SIGNIFICANT
t = +2.9484983E-02 SIGNIFICANCE OF t = NOT SIGNIFICANT
N = 22 DEGREES OF FREEDOM = 20
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
160.00
140.00
120.00
100.00
80.00
60.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, AXIAL POS. BIAXIAL CHS=0.2 MAX STRESS <0022583>

Figure 67

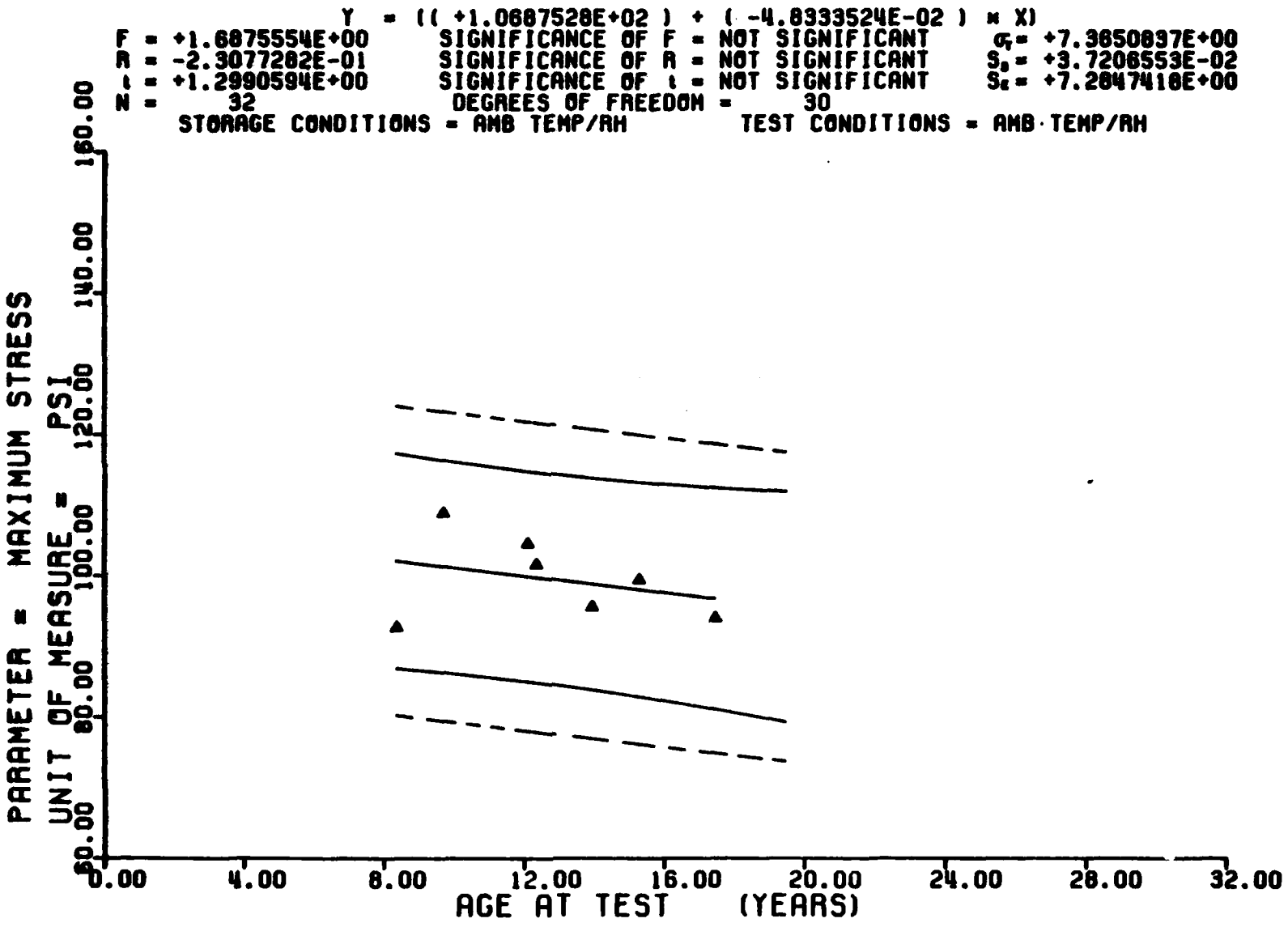
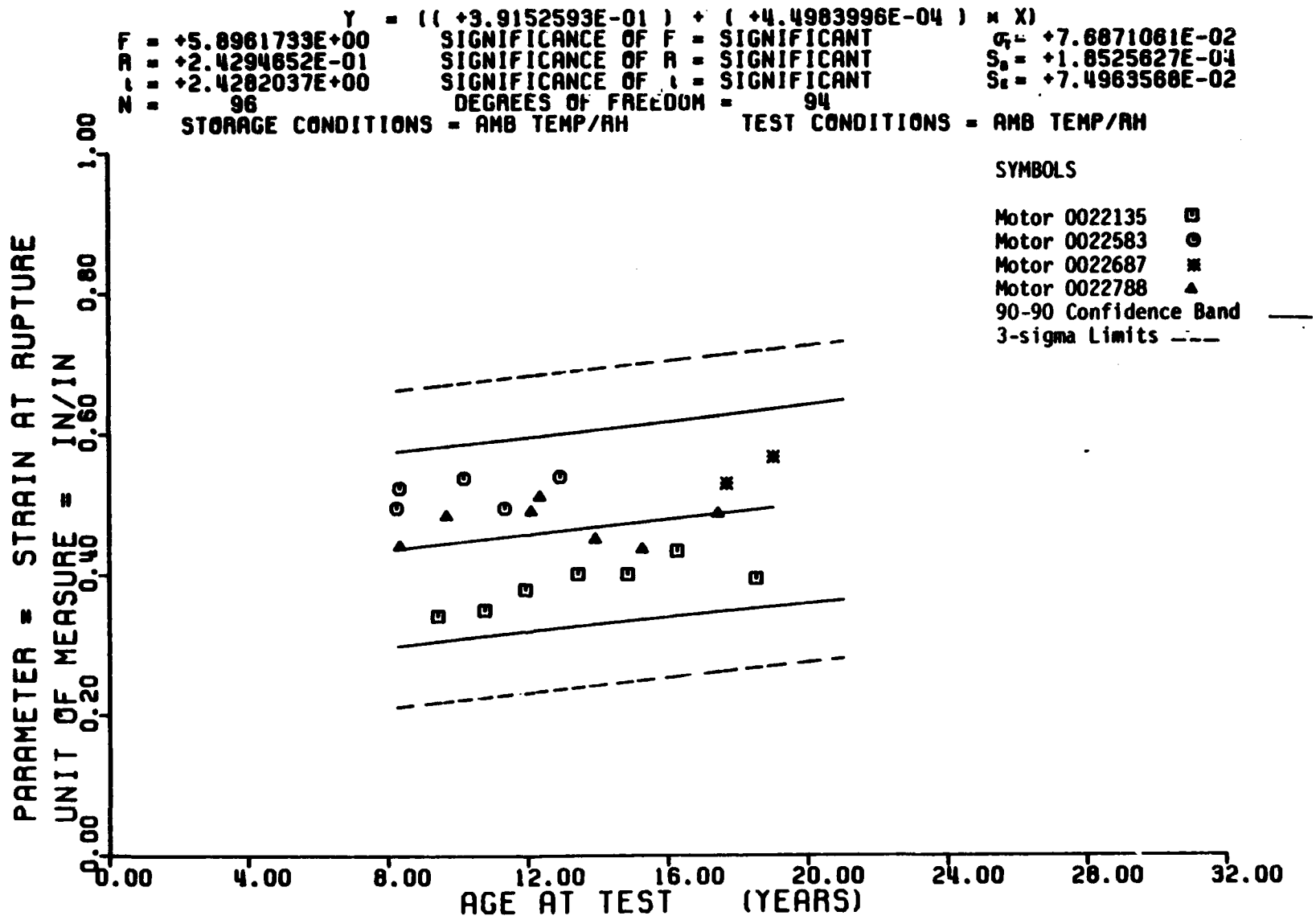

Y = ((+1.0687528E+02) + (-4.8333524E-02) * X)
F = +1.6875554E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σf = +7.3650837E+00
R = -2.3077282E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +3.7206553E-02
t = +1.2990594E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +7.2847418E+00
N = 32 DEGREES OF FREEDOM = 30
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB·TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
160.00
140.00
120.00
100.00
80.00
60.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, AXIAL POS. BIAXIAL CHS=0.2 MAX STRESS <0022788>

Figure 68



II STAGE DSCT MTRS, INNER, AXIAL POS, BIAXIAL CHS-0.2 IN/MIN, STRAIN AT RUPURE

Figure 69

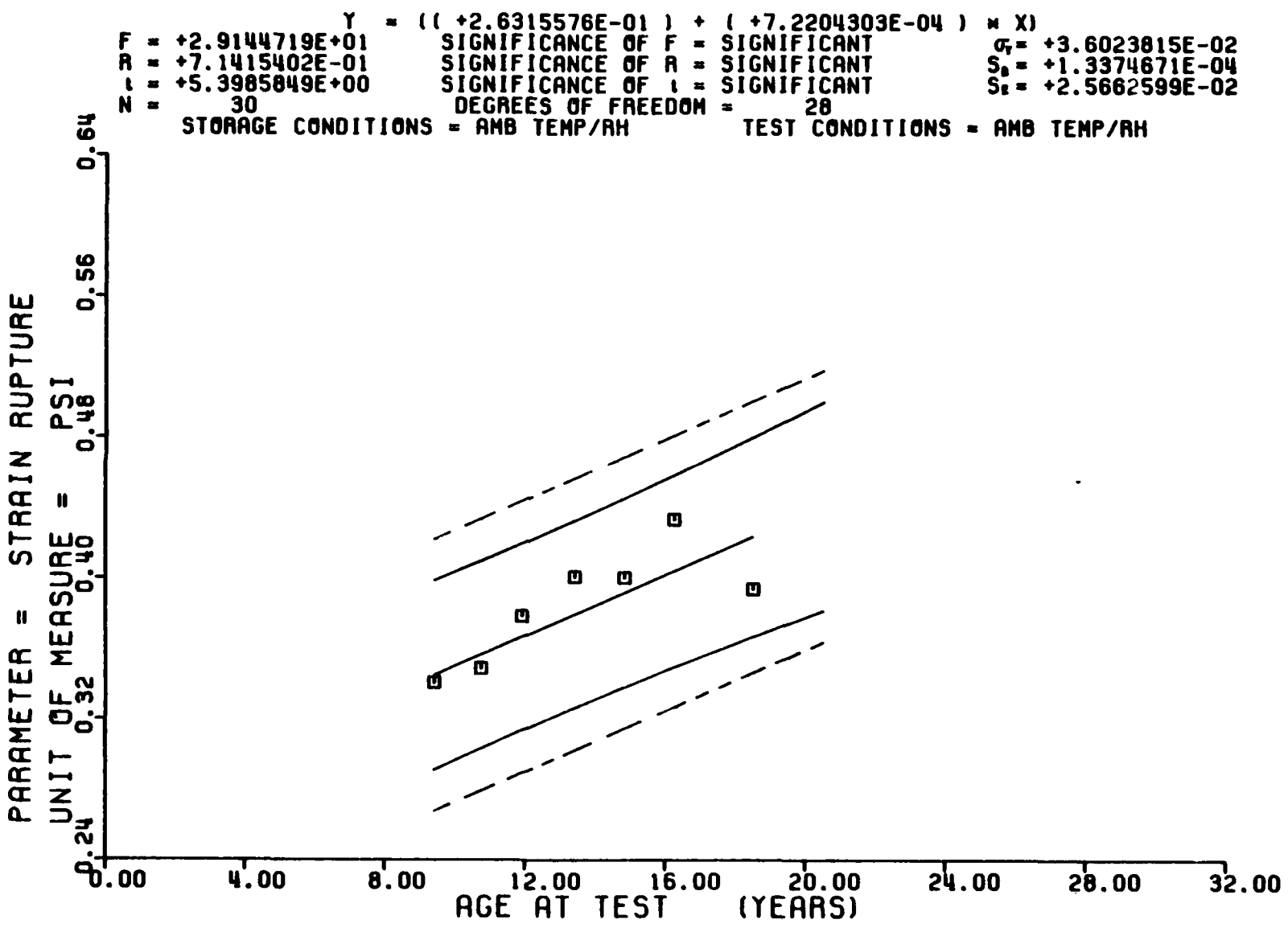

Y = ((+2.6315576E-01) + (+7.2204303E-04) * X)
F = +2.9144719E+01 SIGNIFICANCE OF F = SIGNIFICANT σY = +3.6023815E-02
R = +7.1415402E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.3374671E-04
t = +5.3985849E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +2.5662599E-02
N = 30 DEGREES OF FREEDOM = 28
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.64
0.56
0.48
0.40
0.32
0.24
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, AXIAL POS. BIAXIAL CHS=0.2 STN RUPTUR <0022135>

Figure 70

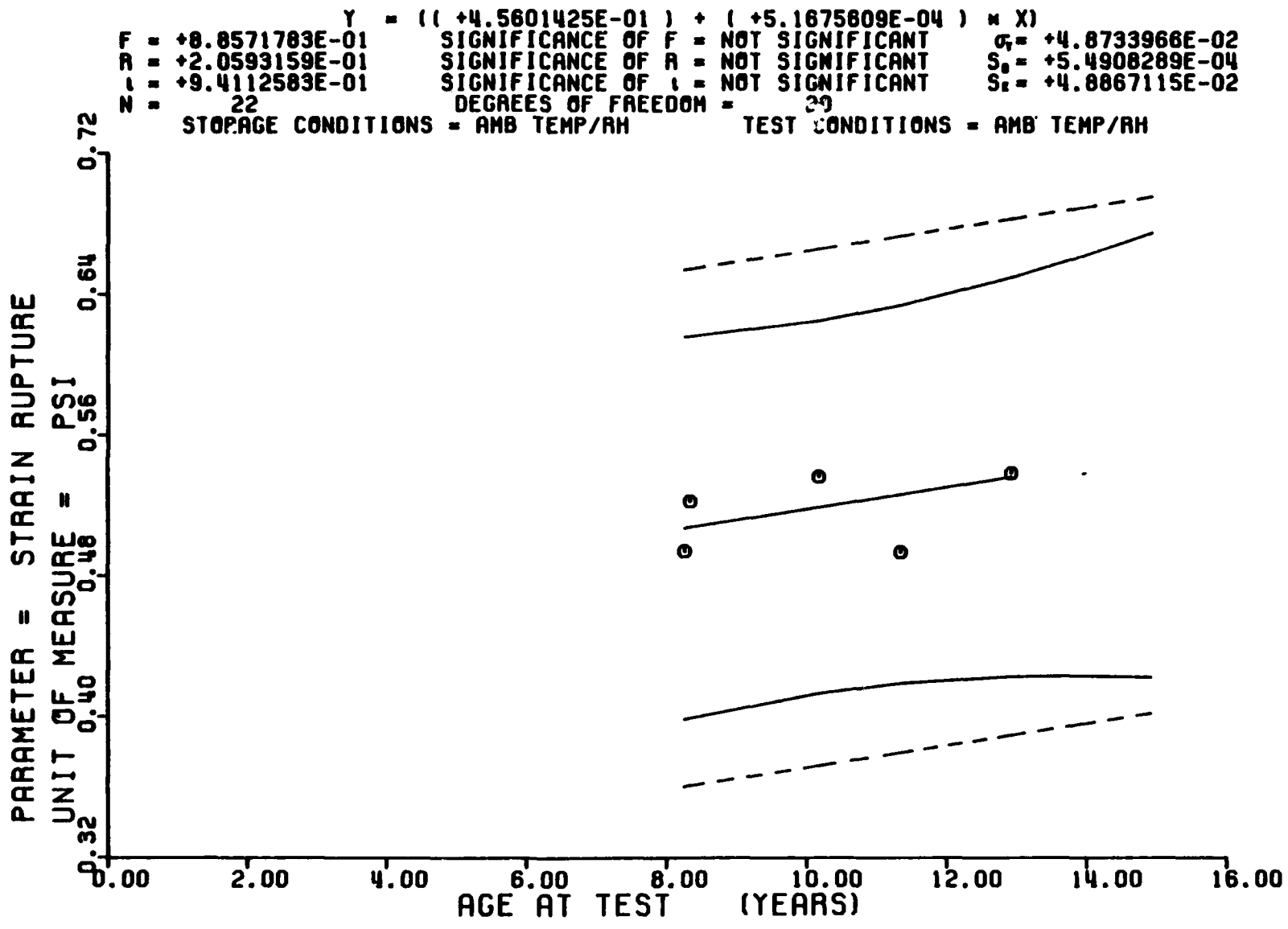

Y = ((+4.5601425E-01) + (+5.1675809E-04) * X)
F = +8.8571783E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +4.8733966E-02
R = +2.0593159E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +5.4908289E-04
t = +9.4112583E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Sr = +4.8867115E-02
N = 22 DEGREES OF FREEDOM = 20
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.72
0.64
0.56
0.48
0.40
0.32
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, AXIAL POS. BIAXIAL CHS=0.2 STRN RUPT <0022583>

Figure 71

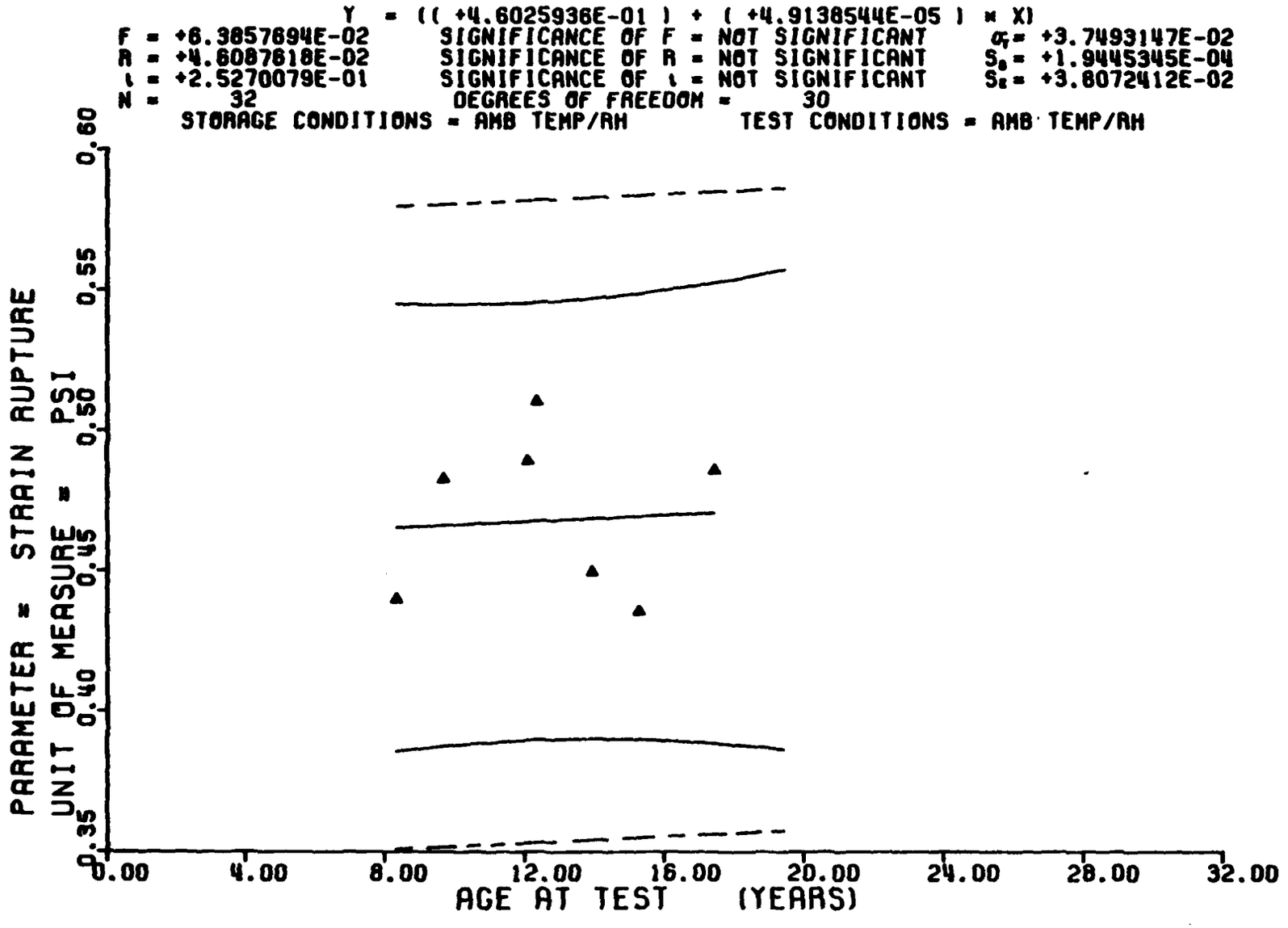
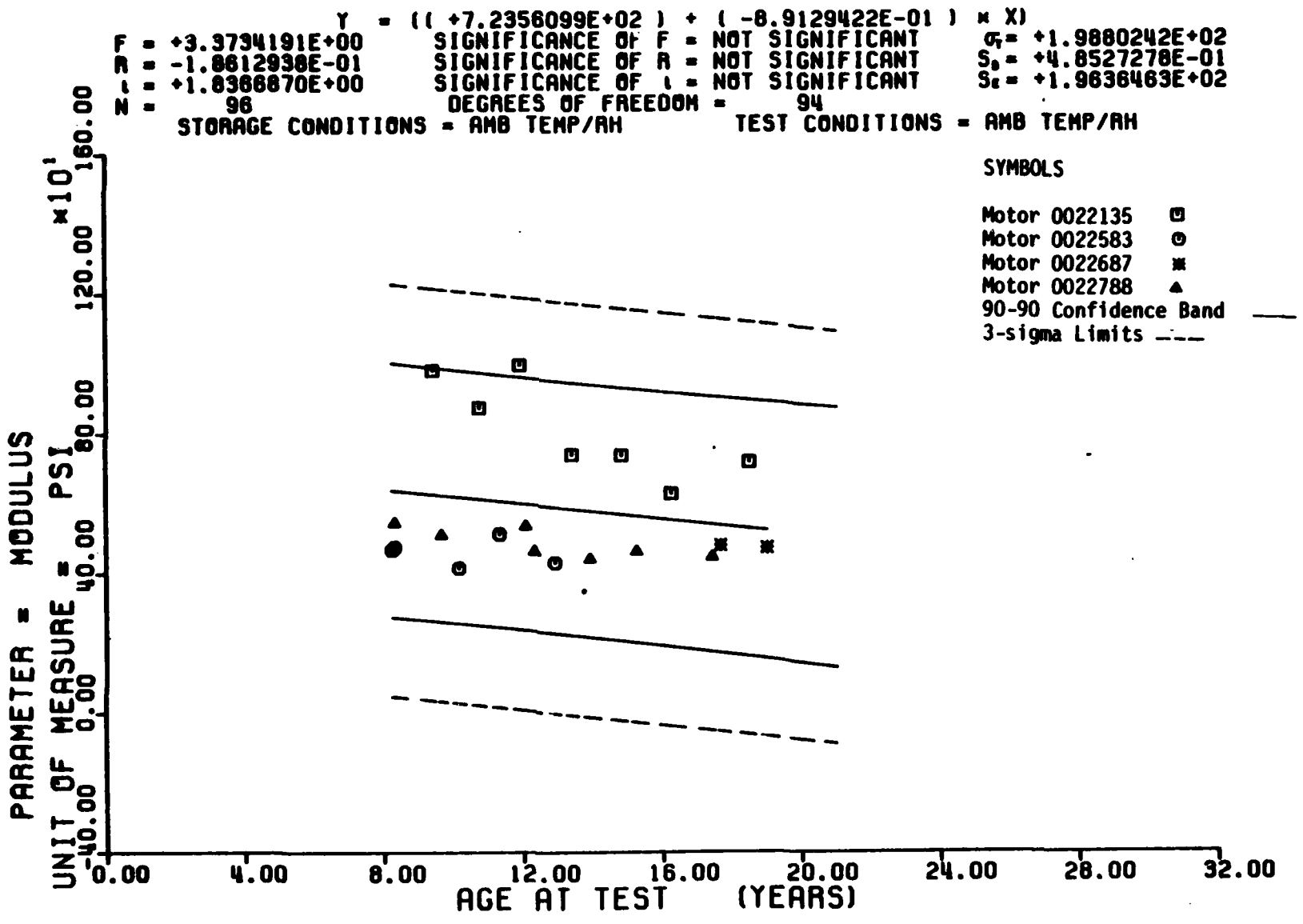

Y = ((+4.6025936E-01) + (+4.9138544E-05) * X)
F = +6.3857694E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +3.7493147E-02
R = +4.6087618E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +1.9445345E-04
t = +2.5270079E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +3.8072412E-02
N = 32 DEGREES OF FREEDOM = 30
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.60
0.55
0.50
0.45
0.40
0.35
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS ONLY, INNER, AXIAL POS. BIAXIAL CHS=0.2 STN RUPTUR <0022788>

Figure 72



II STAGE DSCT MTRS, INNER, AXIAL POS, BIAXIAL CHS=0.2 IN/MIN, MODULUS

Figure 73

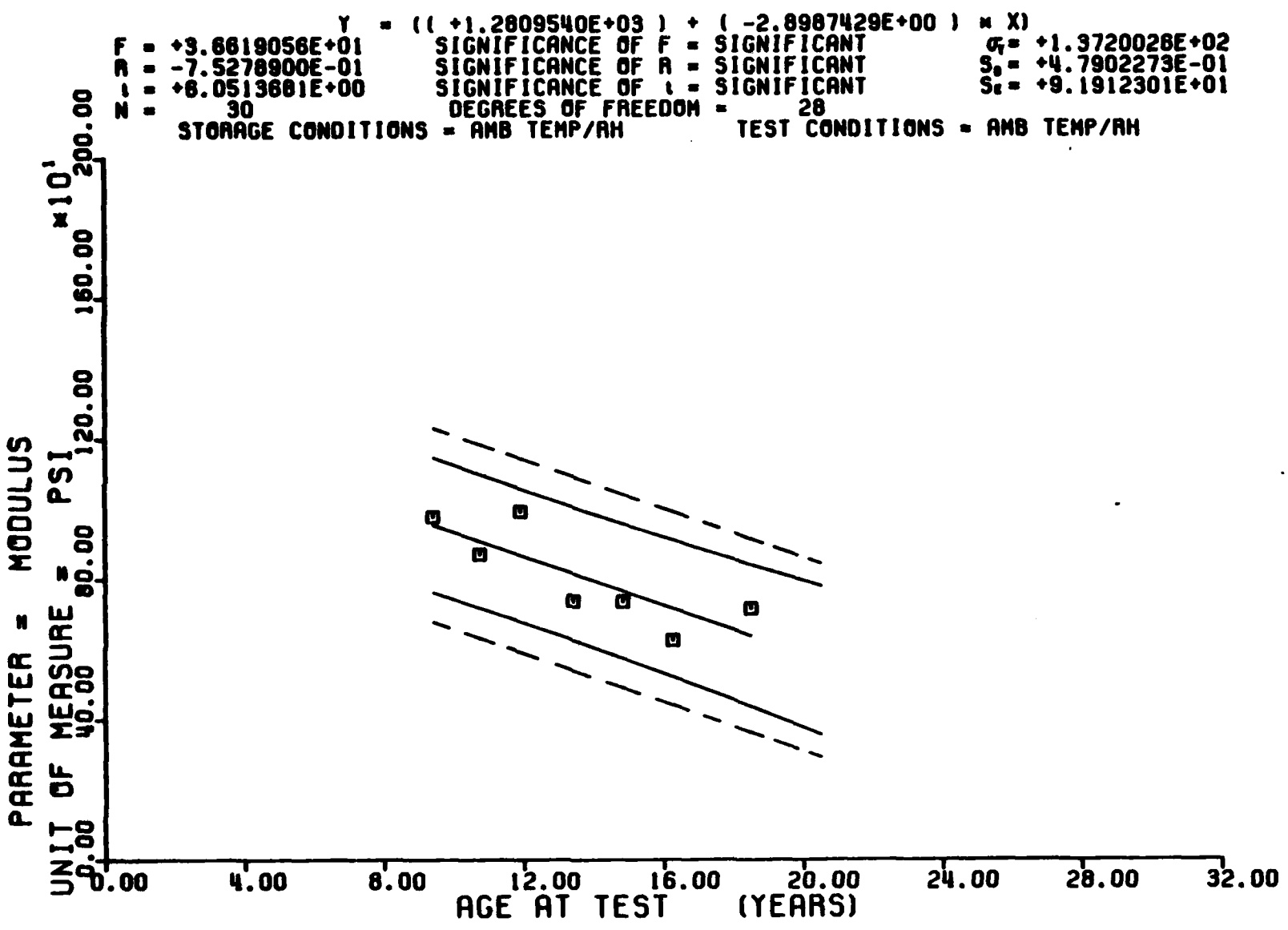

Y = ((+1.2809540E+03) + (-2.8987429E+00) * X)
F = +3.6619056E+01 SIGNIFICANCE OF F = SIGNIFICANT σf = +1.3720026E+02
R = -7.5278900E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +4.7902273E-01
t = +8.0513681E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +9.1912301E+01
N = 30 DEGREES OF FREEDOM = 28
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI x10¹
0.00
40.00
80.00
120.00
160.00
200.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, AXIAL POS. BIAXIAL CHS=0.2 MODULUS <0022135>

Figure 74

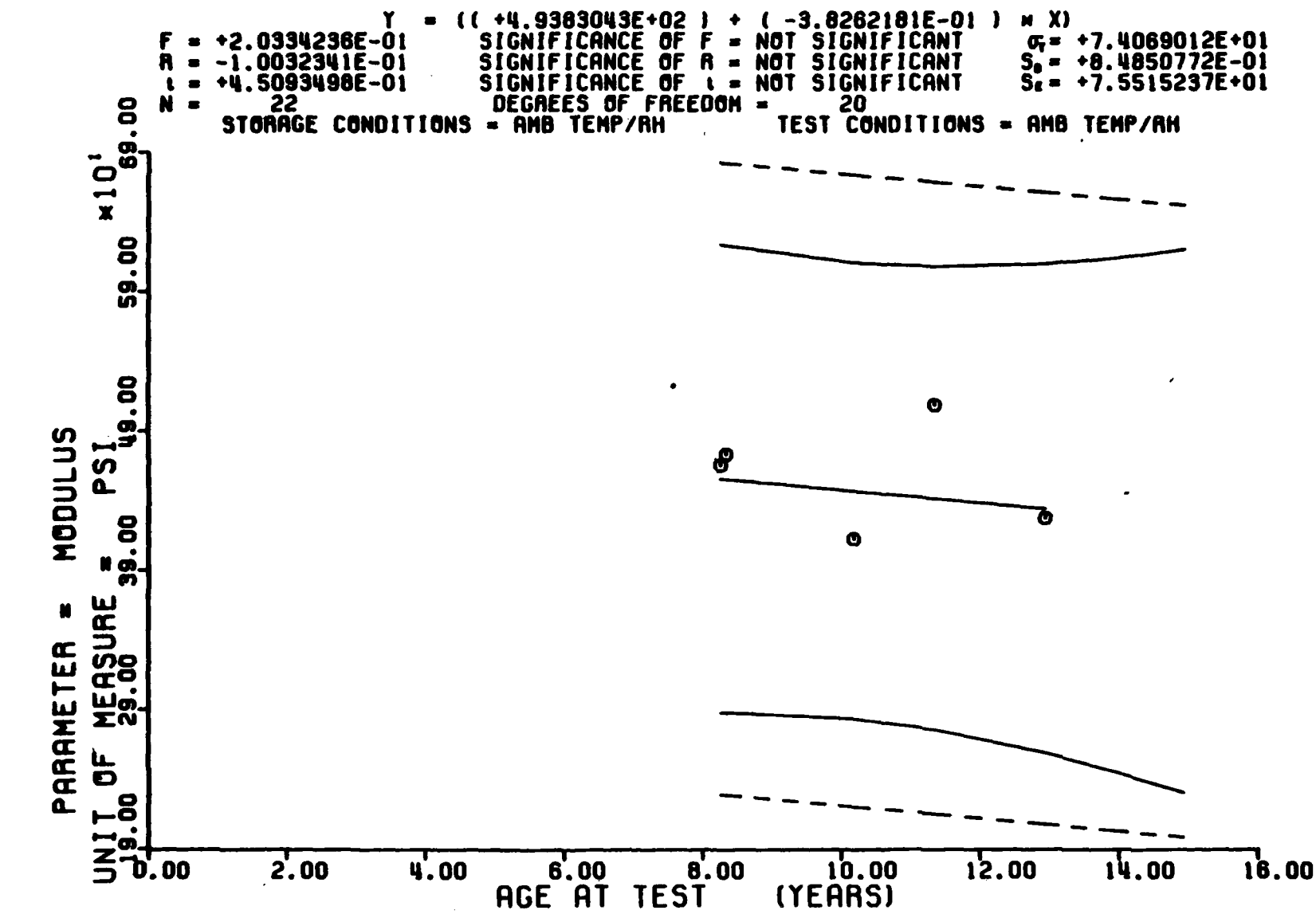

Y = ((+4.9383043E+02) + (-3.8262181E-01) * X)
F = +2.0334236E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +7.4069012E+01
R = -1.0032341E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Se = +8.4850772E-01
t = +4.5093498E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT St = +7.5515237E+01
N = 22 DEGREES OF FREEDOM = 20
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI x10¹
69.00
59.00
49.00
39.00
29.00
19.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, AXIAL POS. BIAXIAL CHS=0.2 MODULUS <0022583>

Figure 75

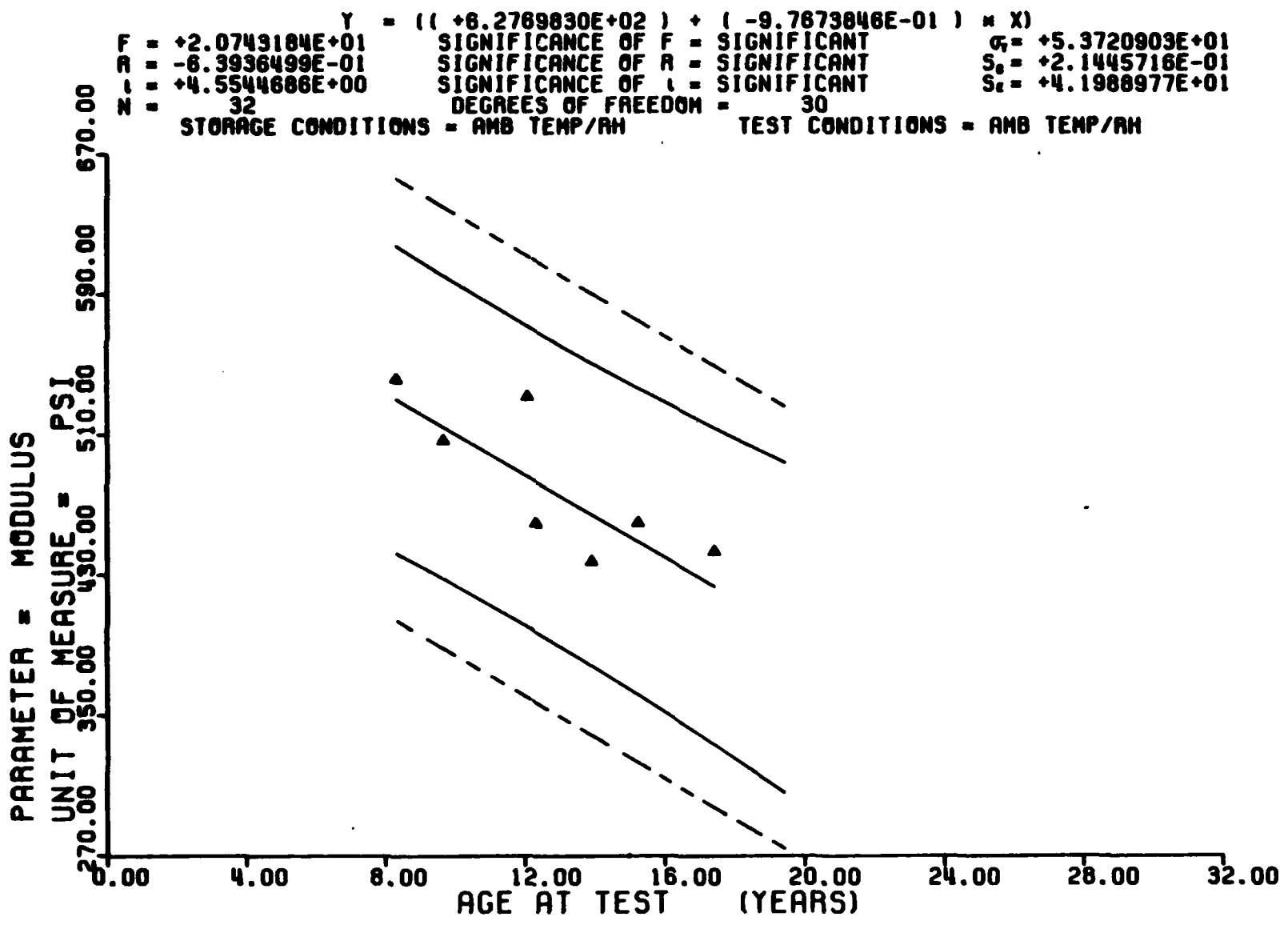
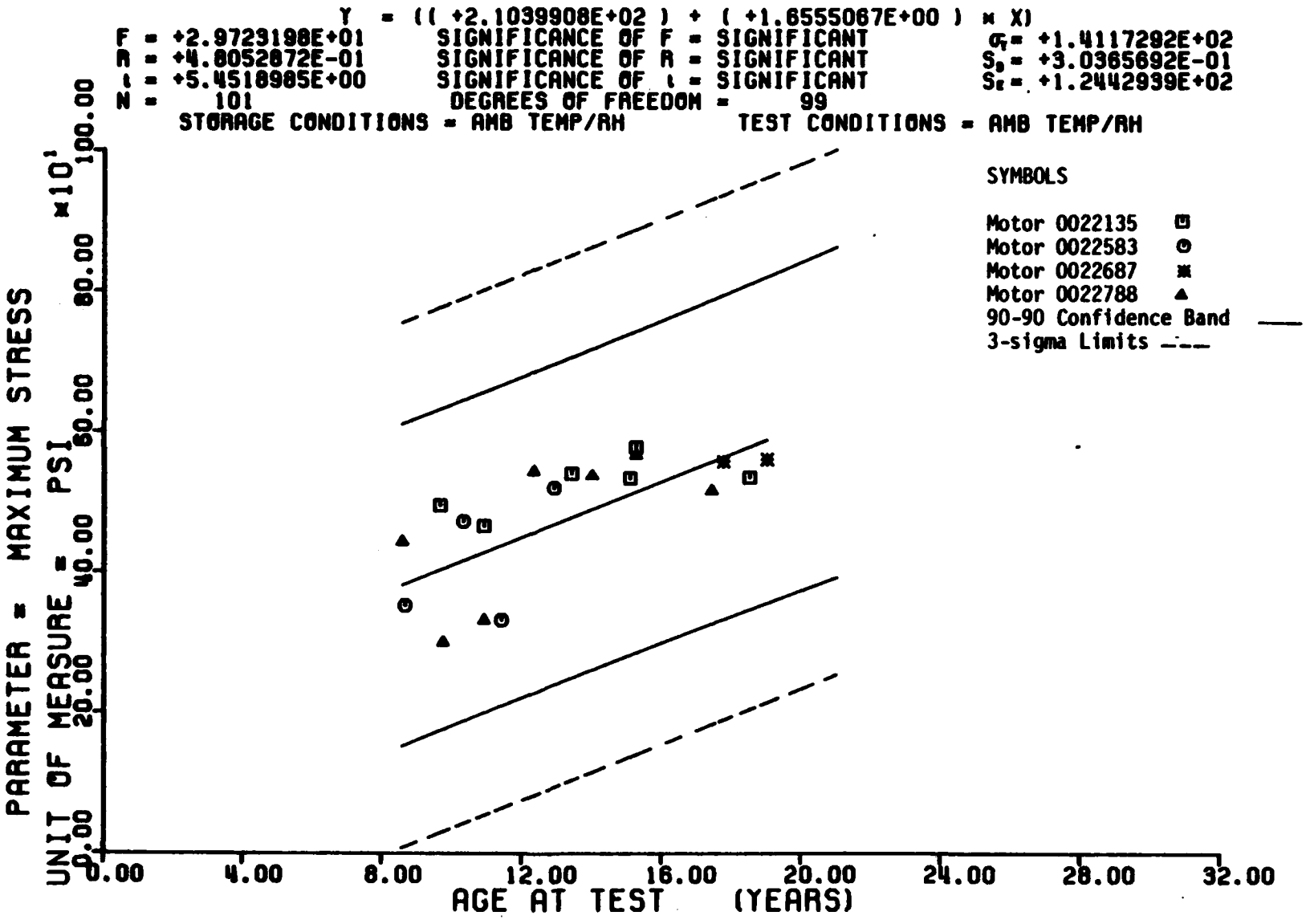

Y = ((+6.2769830E+02) + (-9.7673846E-01) * X)
F = +2.0743184E+01 SIGNIFICANCE OF F = SIGNIFICANT σt = +5.3720903E+01
R = -6.3936499E-01 SIGNIFICANCE OF R = SIGNIFICANT Se = +2.1445716E-01
t = +4.5544686E+00 SIGNIFICANCE OF t = SIGNIFICANT Sc = +4.1988977E+01
N = 32 DEGREES OF FREEDOM = 30
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
670.00
590.00
510.00
430.00
350.00
270.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, AXIAL POS. BIAXIAL CHS=0.2 MODULUS <0022788>

Figure 76



II STAGE DSCT MTRS,OUTER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,MAXIMUM STRESS

Figure 77

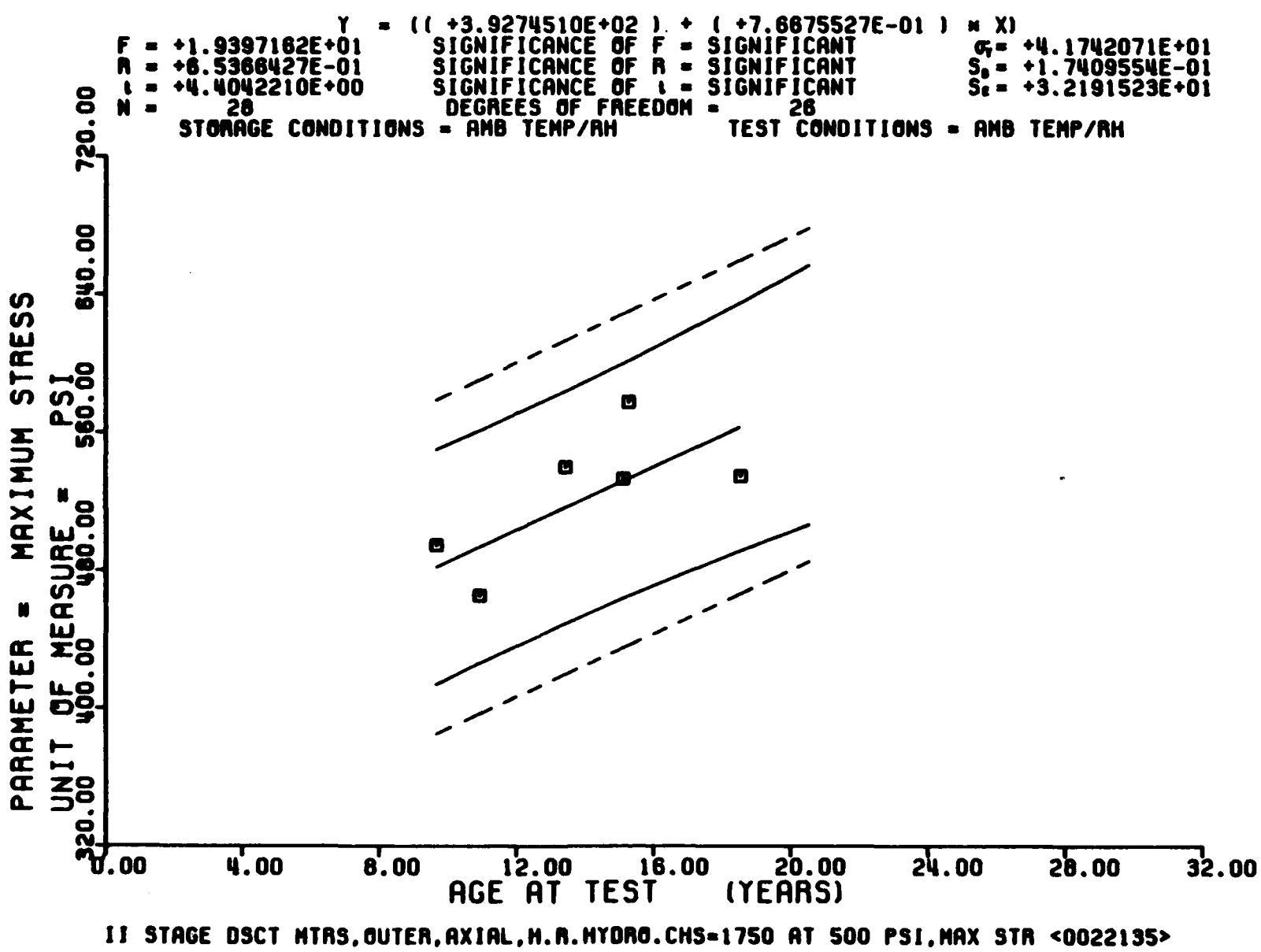

Y = ((+3.9274510E+02) + (+7.6675527E-01) * X)
F = +1.9397162E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +6.5366427E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +4.4042210E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 28 DEGREES OF FREEDOM = 26
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
320.00
400.00
480.00
560.00
640.00
720.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL,M.A.HYDRO.CHS=1750 AT 500 PSI,MAX STR <0022135>

Figure 78

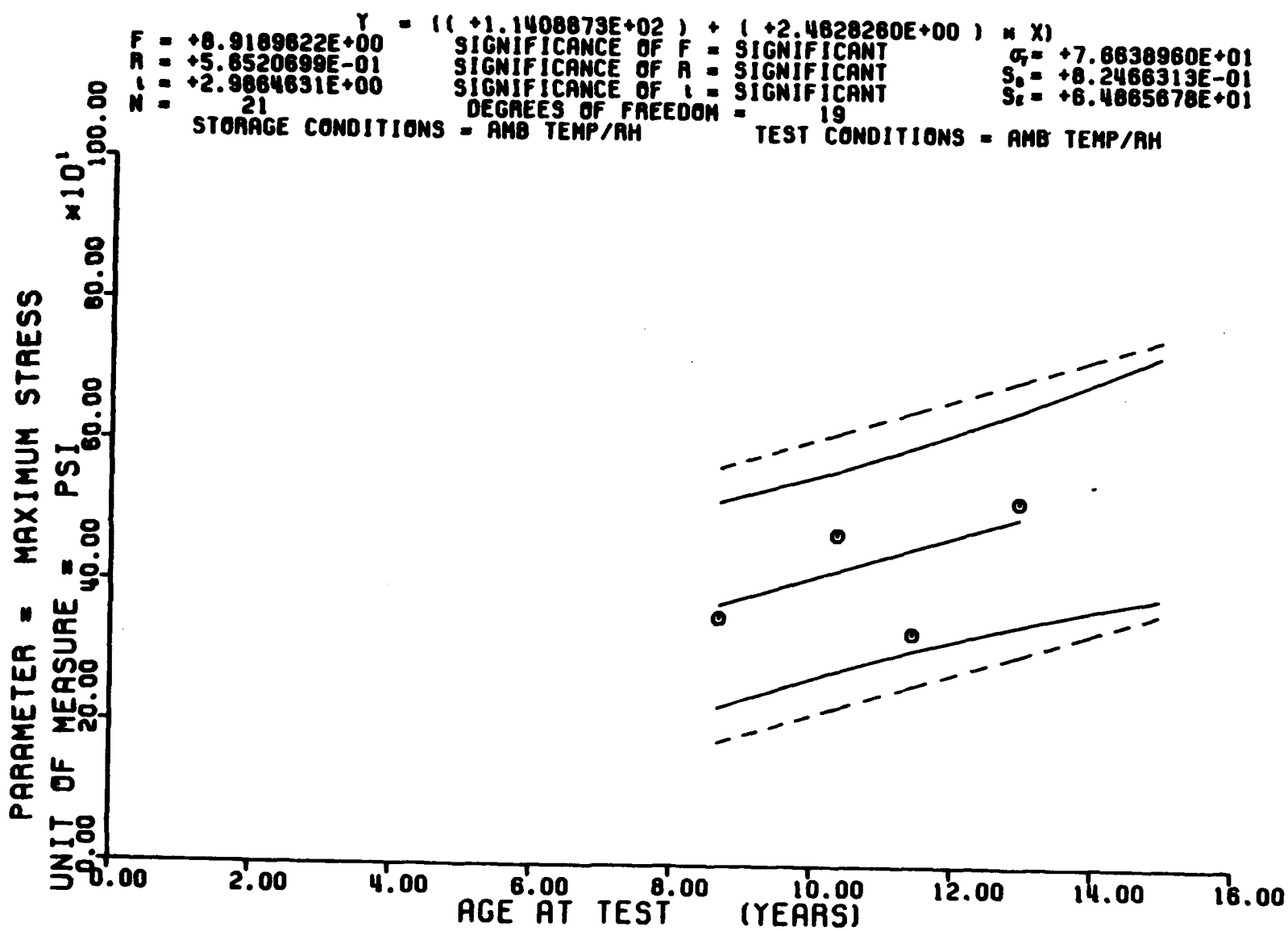

Y = ((+1.1408873E+02) + (+2.4628260E+00) * X)
F = +8.9189622E+00 SIGNIFICANCE OF F = SIGNIFICANT σT = +7.6838960E+01
R = +5.6520699E-01 SIGNIFICANCE OF R = SIGNIFICANT Se = +8.2466313E-01
t = +2.9864631E+00 SIGNIFICANCE OF t = SIGNIFICANT Sz = +6.4865678E+01
N = 21 DEGREES OF FREEDOM = 19
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
×10¹
100.00
80.00
60.00
40.00
20.00
0.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS,OUTER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,MAX STR <0022583>

Figure 79

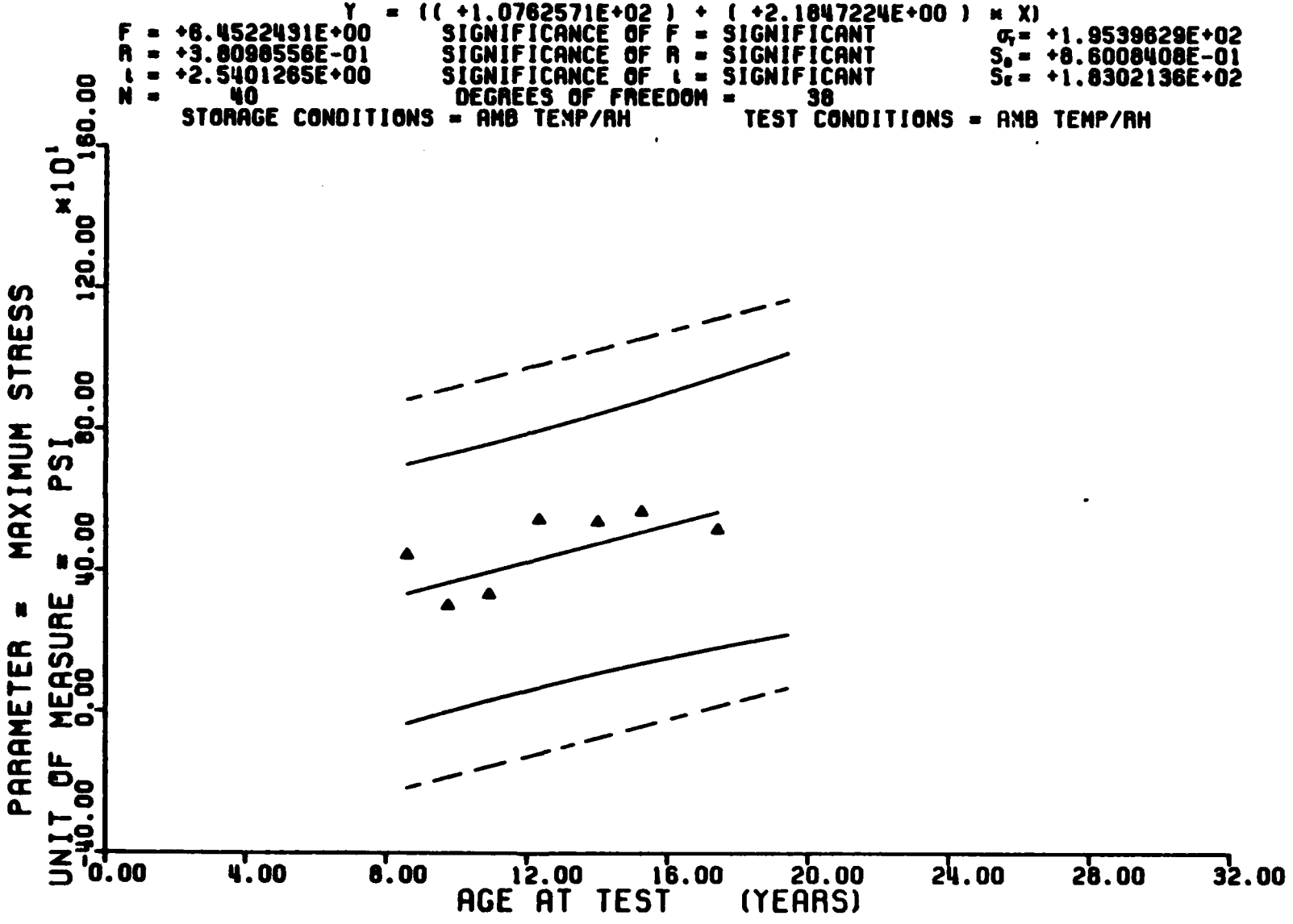
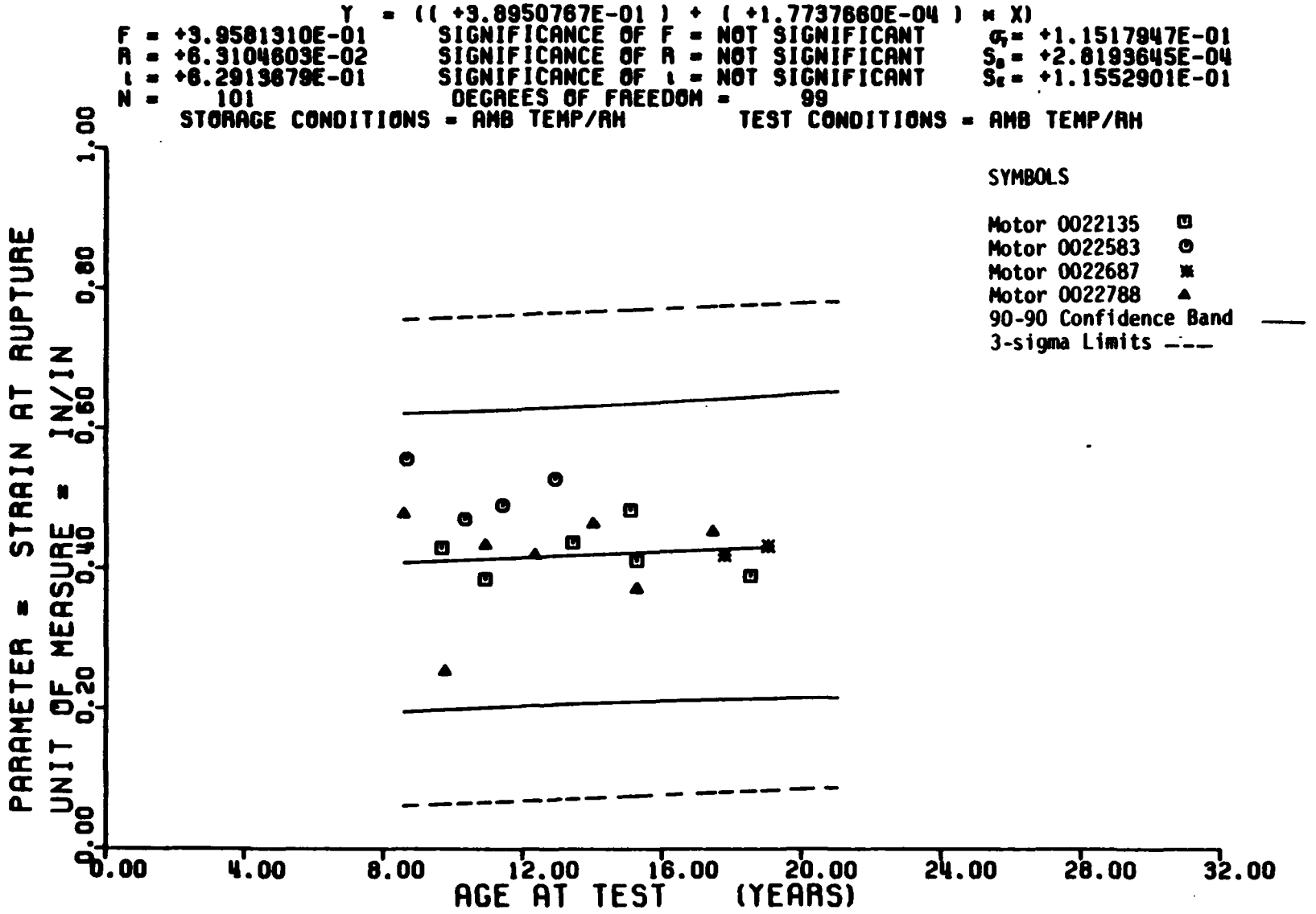

Y = ((+1.0762571E+02) + (+2.1847224E+00) * X)
F = +6.4522431E+00 SIGNIFICANCE OF F = SIGNIFICANT σ_r = +1.9539629E+02
R = +3.8098556E-01 SIGNIFICANCE OF R = SIGNIFICANT S_b = +8.6008408E-01
t = +2.5401265E+00 SIGNIFICANCE OF t = SIGNIFICANT S_E = +1.8302136E+02
N = 40 DEGREES OF FREEDOM = 38
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
×10¹
160.00
120.00
80.00
40.00
0.00
-40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL,M.R.HYDRO.CHS=1750 AT 500 PSI,MAX STR <0022788>

Figure 80



II STAGE DSCT MTRS,OUTER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,STRAIN/RUPTURE

Figure 81

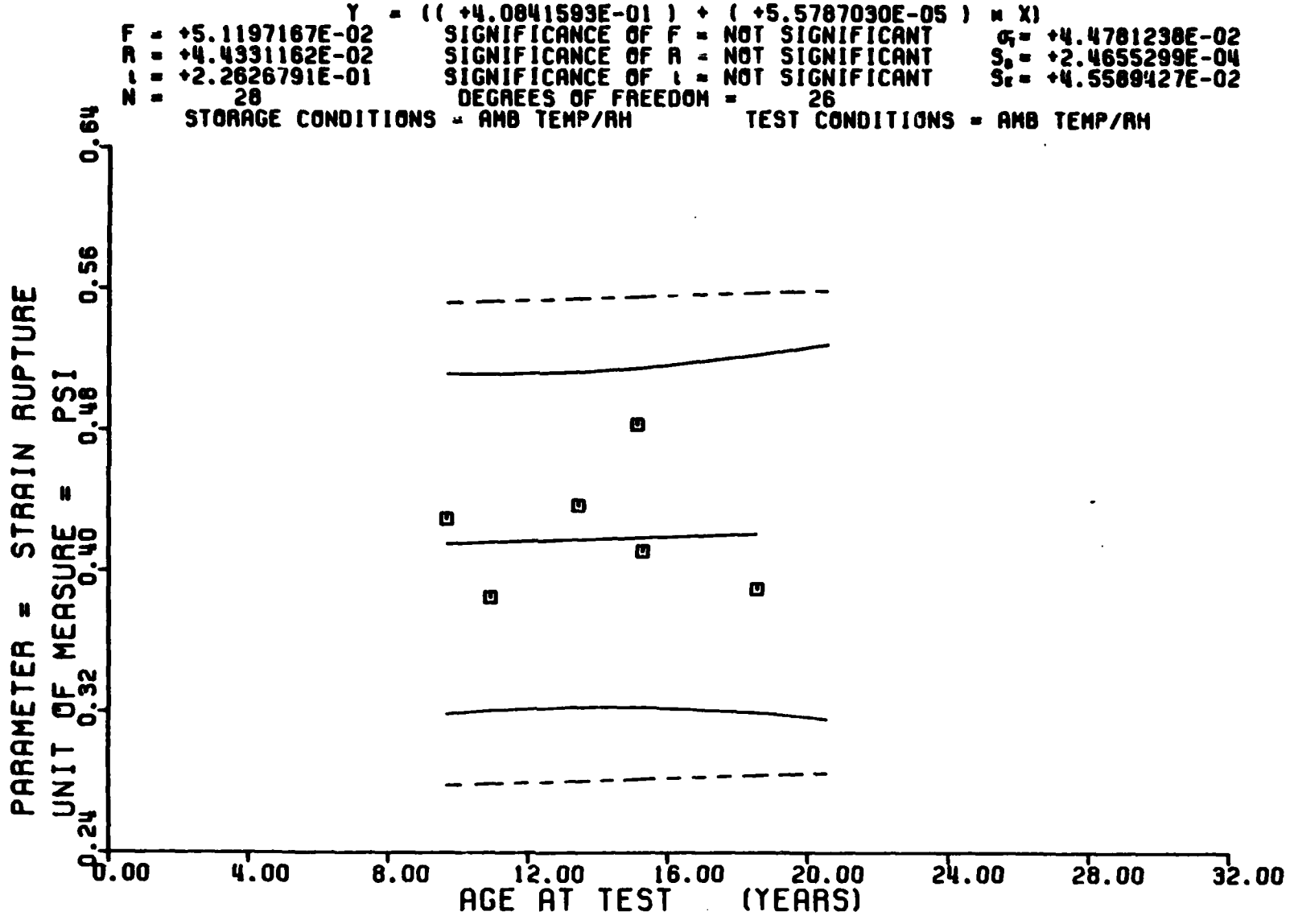

Y = ((+4.0841593E-01) + (+5.5787030E-05) * X)
F = +5.1197167E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT σ1 = +4.4781238E-02
R = +4.4331162E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +2.4655299E-04
t = +2.2626791E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +4.5589427E-02
N = 28 DEGREES OF FREEDOM = 26
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.64
0.56
0.48
0.40
0.32
0.24
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,STN RUP <0022135>

Figure 82

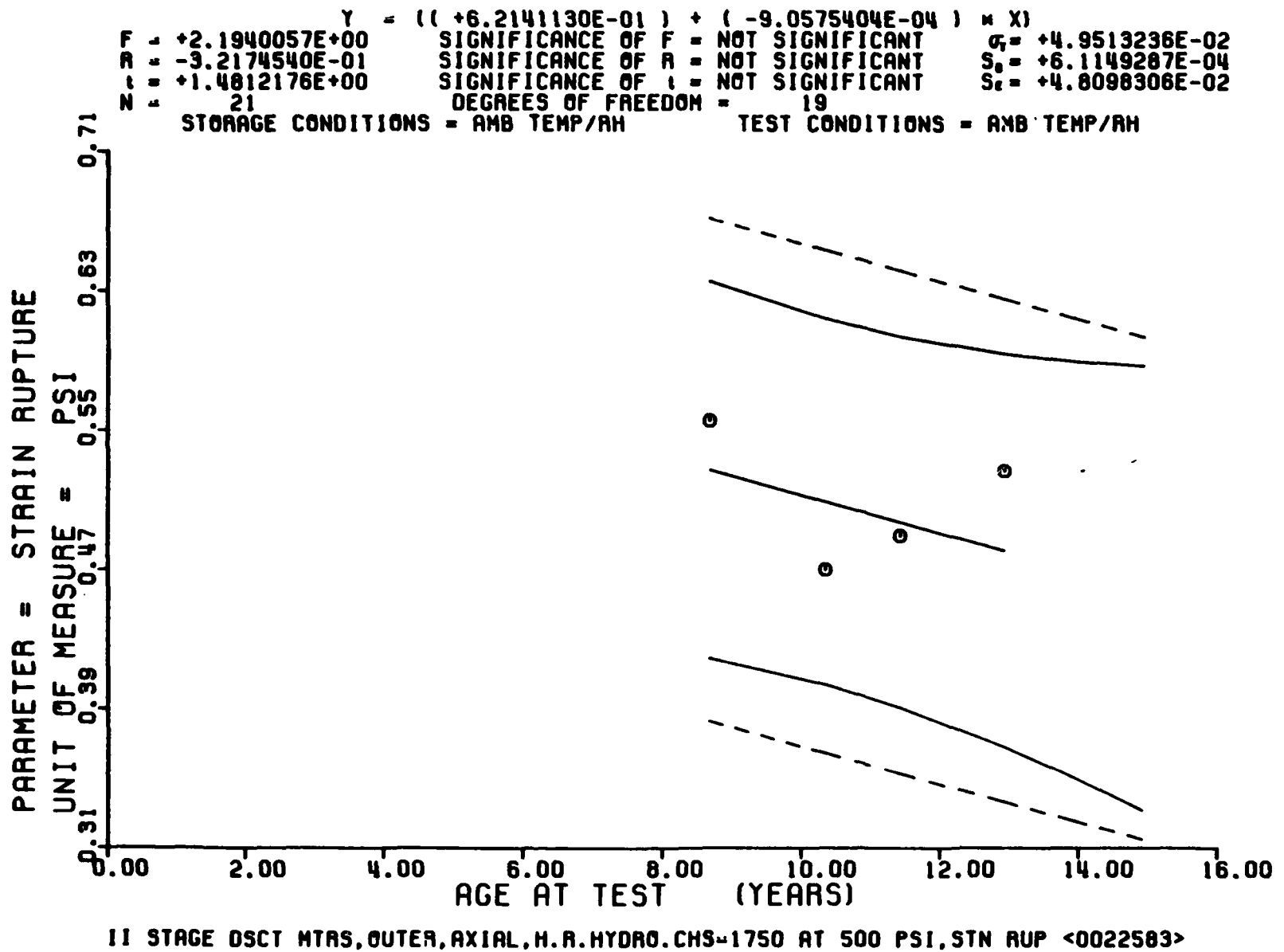

Y = ((+6.2141130E-01) + (-9.0575404E-04) * X)
F = +2.1940057E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +4.9513236E-02
R = -3.2174540E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +6.1149287E-04
t = +1.4812176E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +4.8098306E-02
N = 21 DEGREES OF FREEDOM = 19
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.71
0.63
0.55
0.47
0.39
0.31
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL,H.R.HYDRO.CHS-1750 AT 500 PSI,STN RUP <0022583>

Figure 83

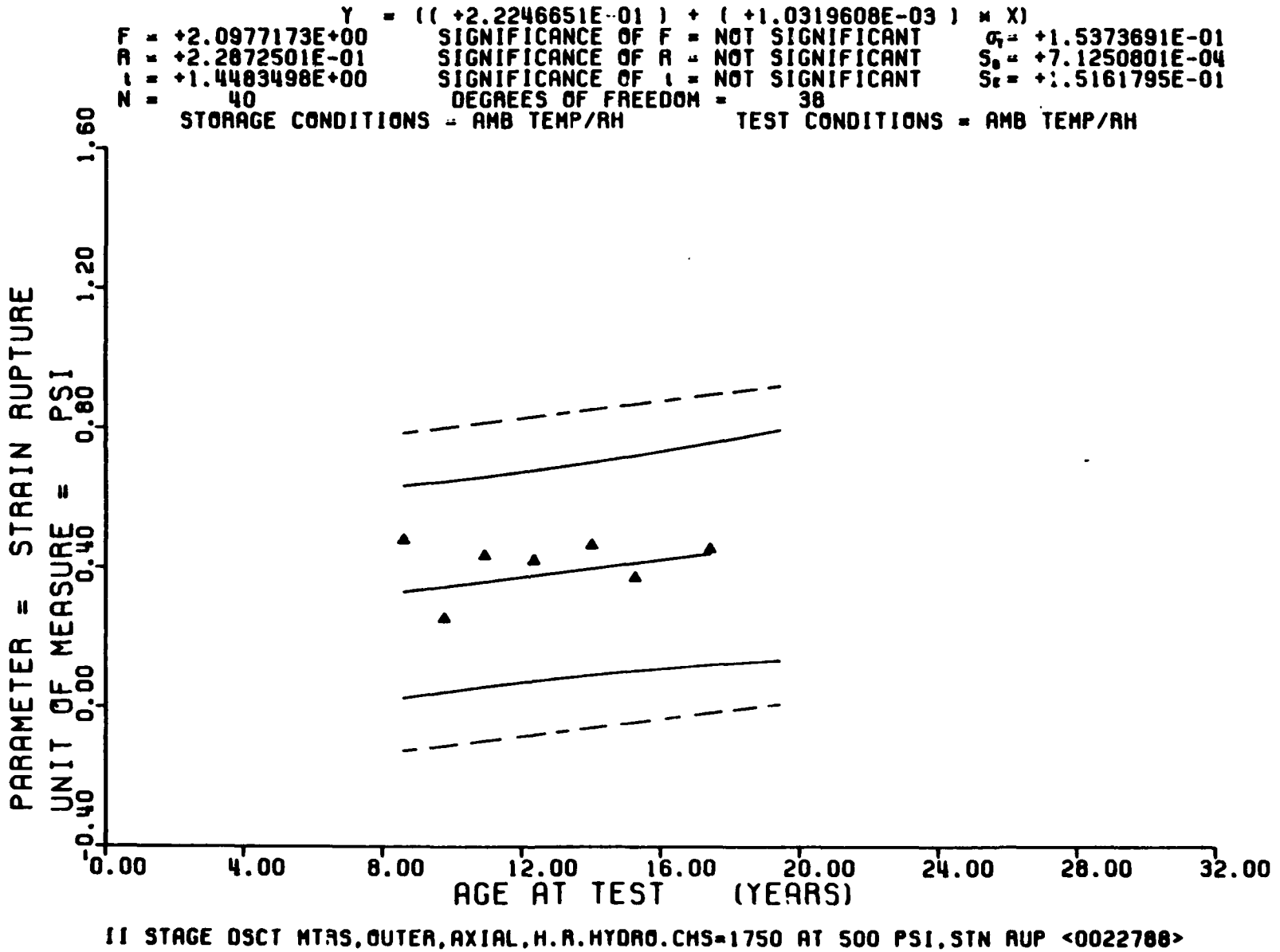

Y = ((+2.2246651E-01) + (+1.0319608E-03) * X)
F = +2.0977173E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σ1 = +1.5373691E-01
R = +2.2872501E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +7.1250801E-04
t = +1.4483498E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +1.5161795E-01
N = 40 DEGREES OF FREEDOM = 38
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
1.60
1.20
0.80
0.40
0.00
-0.40
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS,OUTER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,STN RUP <0022788>

Figure 84

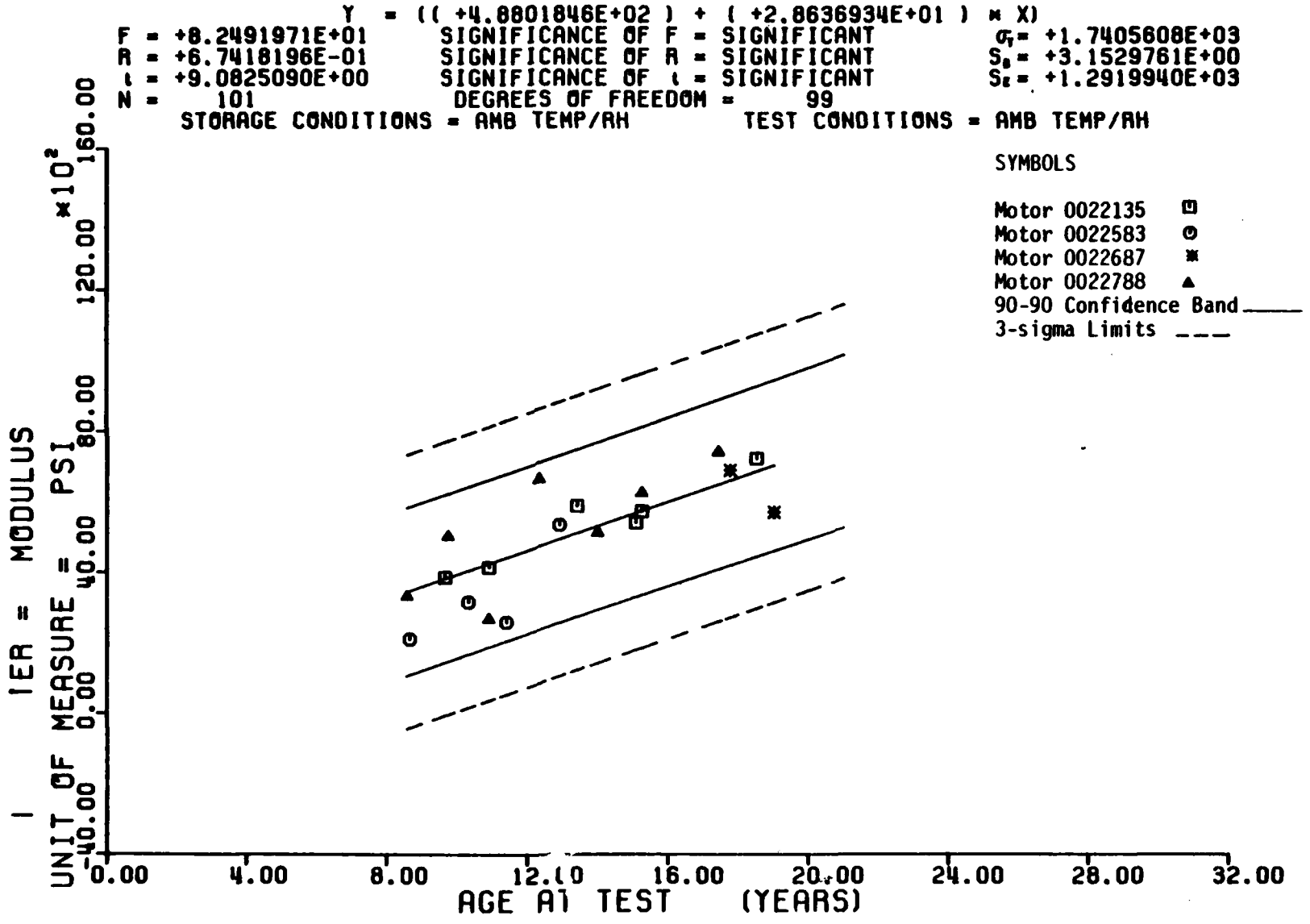

Y = ((+4.8801846E+02) + (+2.8636934E+01) * X)
F = +8.2491971E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +6.7418196E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +9.0825090E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 101 DEGREES OF FREEDOM = 99
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σT= +1.7405608E+03
Sb= +3.1529761E+00
Sε= +1.2919940E+03
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
UNIT OF MEASURE = PSI
160.00
120.00
80.00
40.00
0.00
-40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI, MODULUS

Figure 85

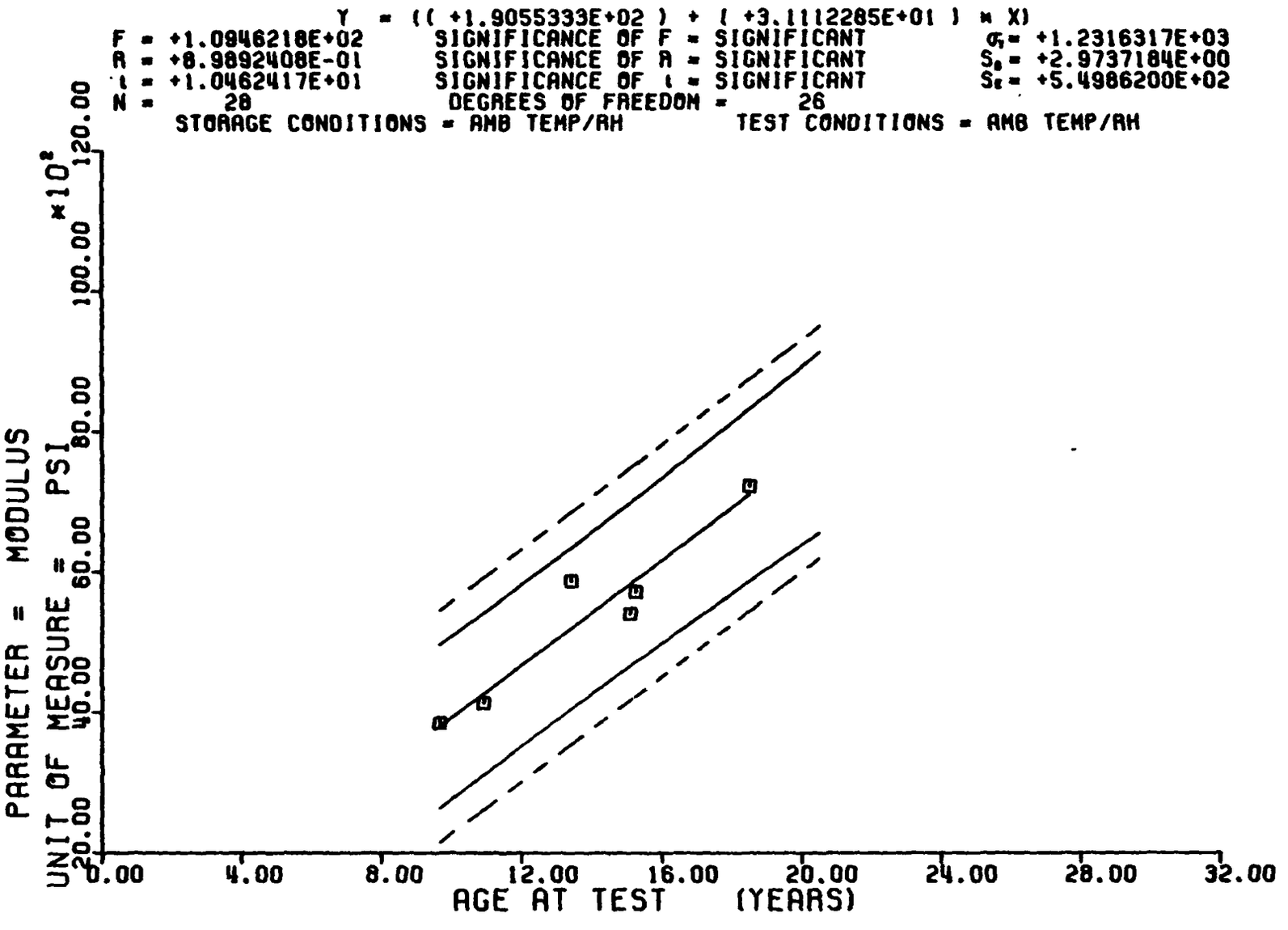

Y = ((+1.9055333E+02) + (+3.1112285E+01) * X)
F = +1.0946218E+02 SIGNIFICANCE OF F = SIGNIFICANT
R = +8.9892408E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +1.0462417E+01 SIGNIFICANCE OF t = SIGNIFICANT
N = 28 DEGREES OF FREEDOM = 26
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σt = +1.2316317E+03
Se = +2.9737184E+00
Sε = +5.4986200E+02
PARAMETER = MODULUS
UNIT OF MEASURE = PSI x10²
20.00
40.00
60.00
80.00
100.00
120.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,MODULUS <0022135>

Figure 86

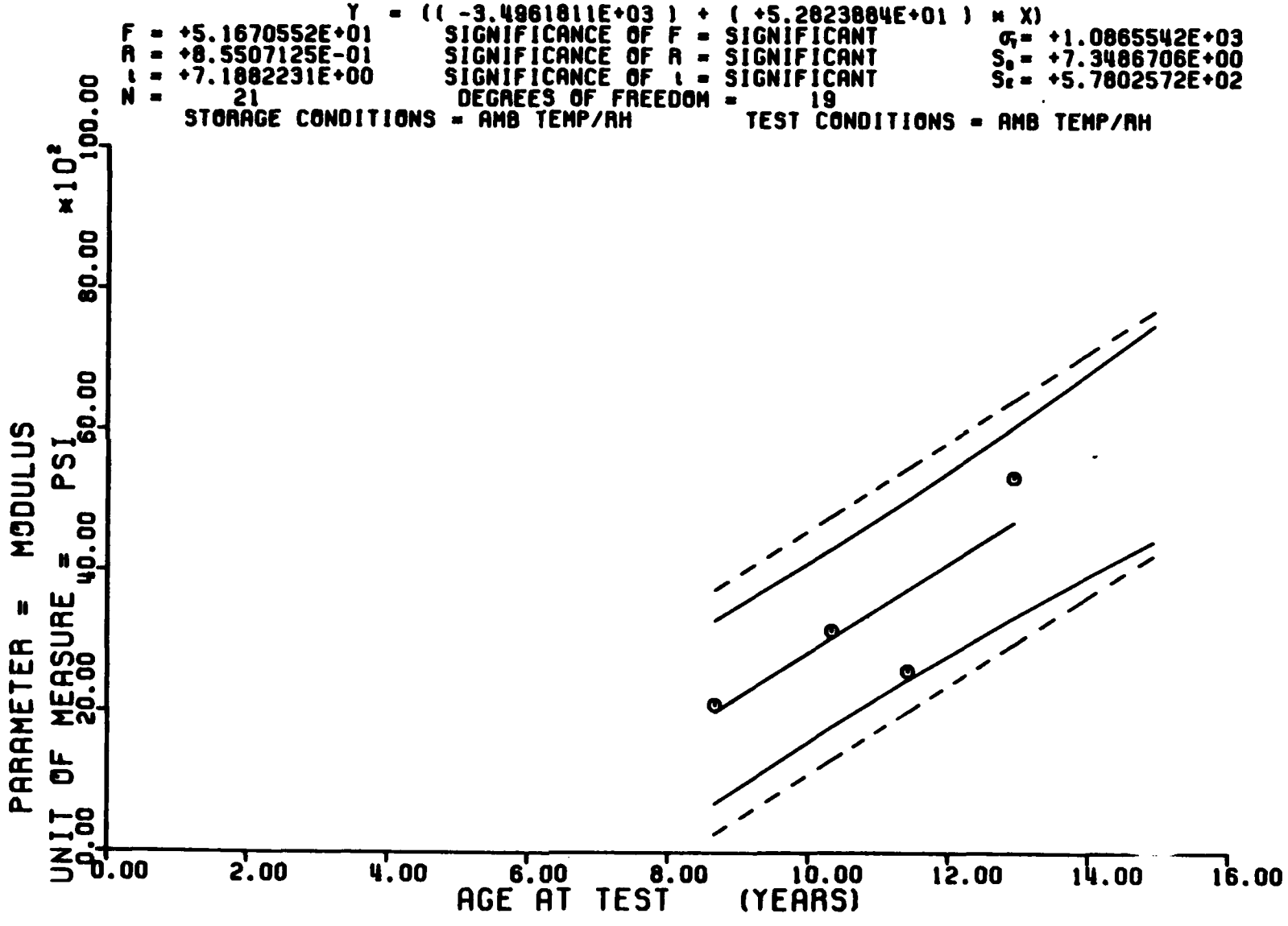

Y = ((-3.4961811E+03) + (+5.2823884E+01) * X)
F = +5.1670552E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +8.5507125E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +7.1882231E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 21 DEGREES OF FREEDOM = 19
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σt= +1.0865542E+03
Se= +7.3486706E+00
Sr= +5.7802572E+02
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
*10²
100.00
80.00
60.00
40.00
20.00
0.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,MODULUS <0022583>

Figure 87

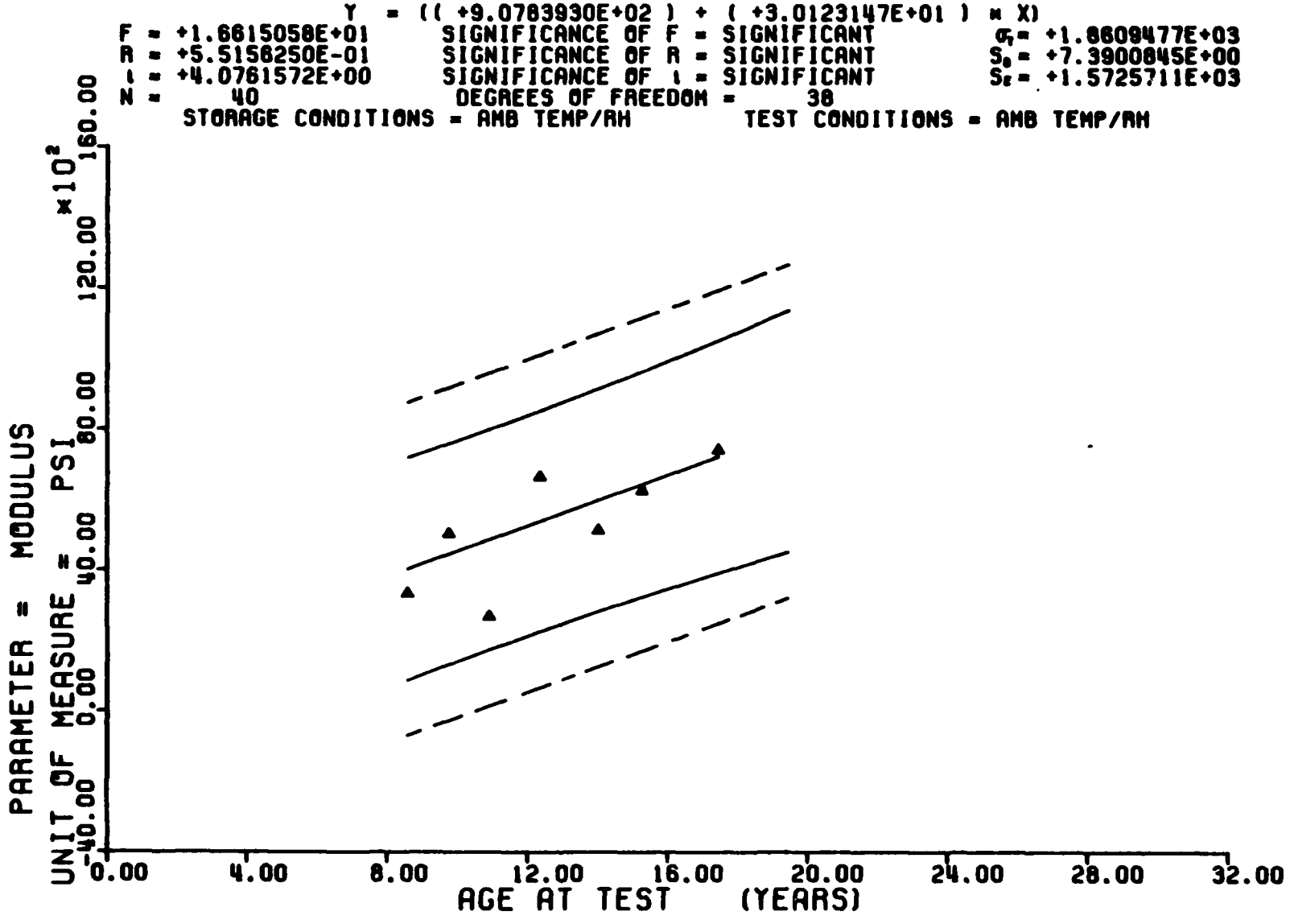

Y = ((+9.0783930E+02) + (+3.0123147E+01) * X)
F = +1.6615058E+01 SIGNIFICANCE OF F = SIGNIFICANT σt = +1.8608477E+03
R = +5.5156250E-01 SIGNIFICANCE OF R = SIGNIFICANT So = +7.3900845E+00
t = +4.0761572E+00 SIGNIFICANCE OF t = SIGNIFICANT Sz = +1.5725711E+03
N = 40 DEGREES OF FREEDOM = 38
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI x10²
160.00
120.00
80.00
40.00
0.00
-40.00
0.00 4.00 8.00 12.00 16.00 20.00 24.00 28.00 32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,OUTER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,MODULUS <0022788>

Figure 88

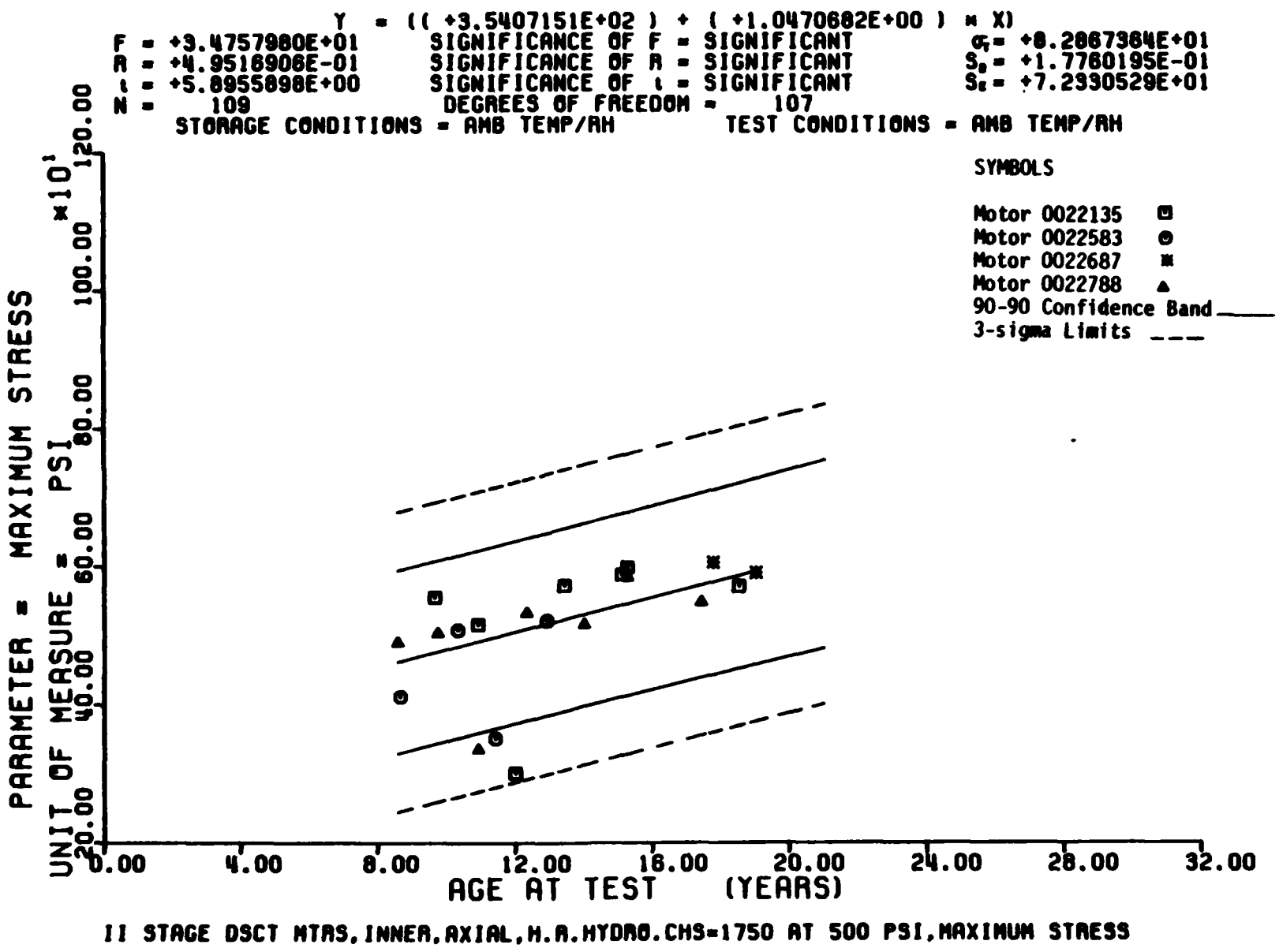

Y = ((+3.5407151E+02) + (+1.0470682E+00) * X)
F = +3.4757980E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +4.9516906E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +5.8955898E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 109 DEGREES OF FREEDOM = 107
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σt = +8.2867364E+01
Sb = +1.7760195E-01
Se = +7.2330529E+01
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI x10¹
120.00
100.00
80.00
60.00
40.00
20.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS, INNER, AXIAL, H.A. HYDRO. CHS=1750 AT 500 PSI, MAXIMUM STRESS

Figure 89

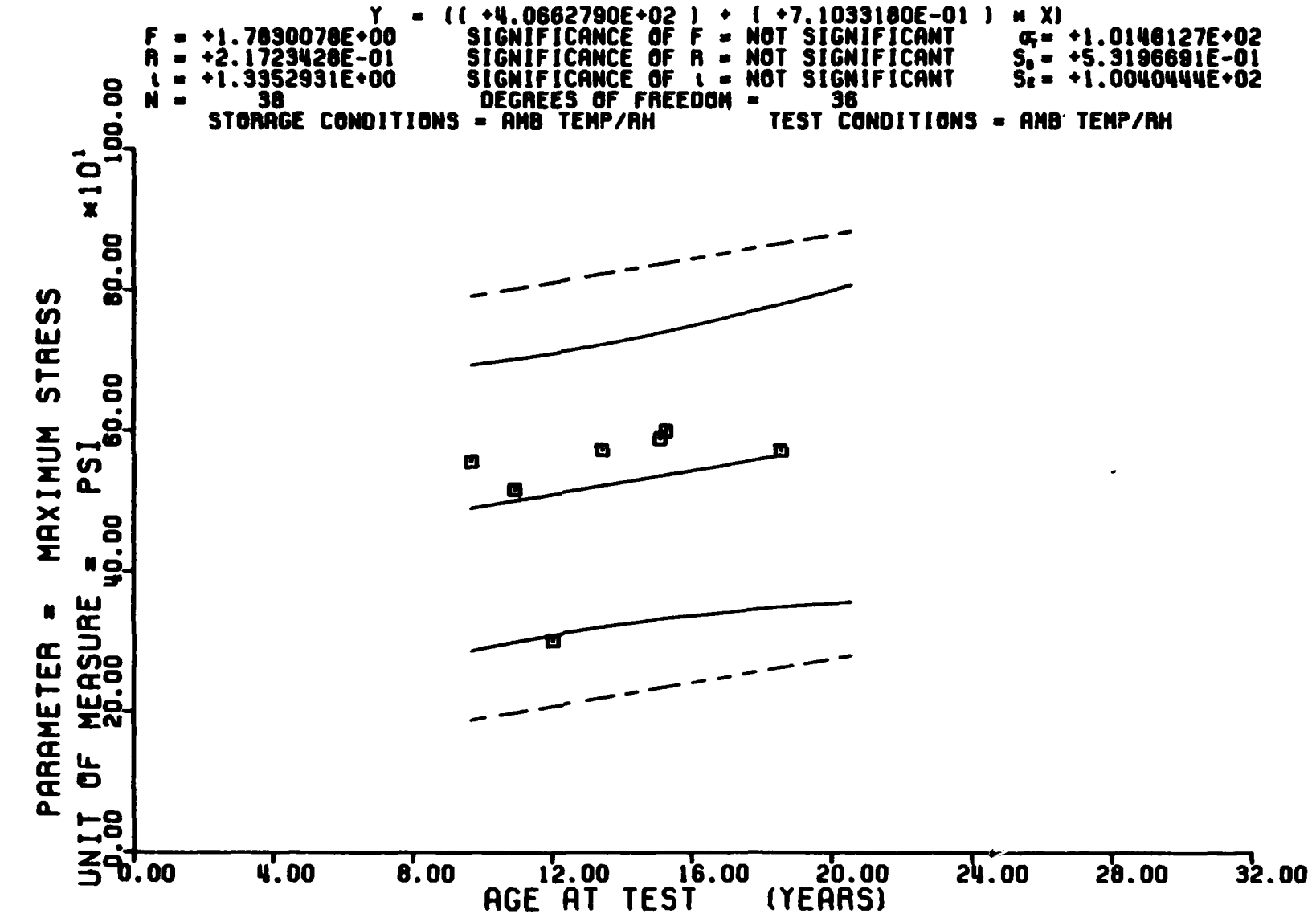

Y = ((+4.0662790E+02) + (+7.1033180E-01) * X)
F = +1.7830078E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +1.0146127E+02
R = +2.1723428E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +5.3196691E-01
t = +1.3352931E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sz = +1.0040444E+02
N = 38 DEGREES OF FREEDOM = 36
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
×10¹
100.00
80.00
60.00
40.00
20.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,INNER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,MAX STR <0022135>

Figure 90

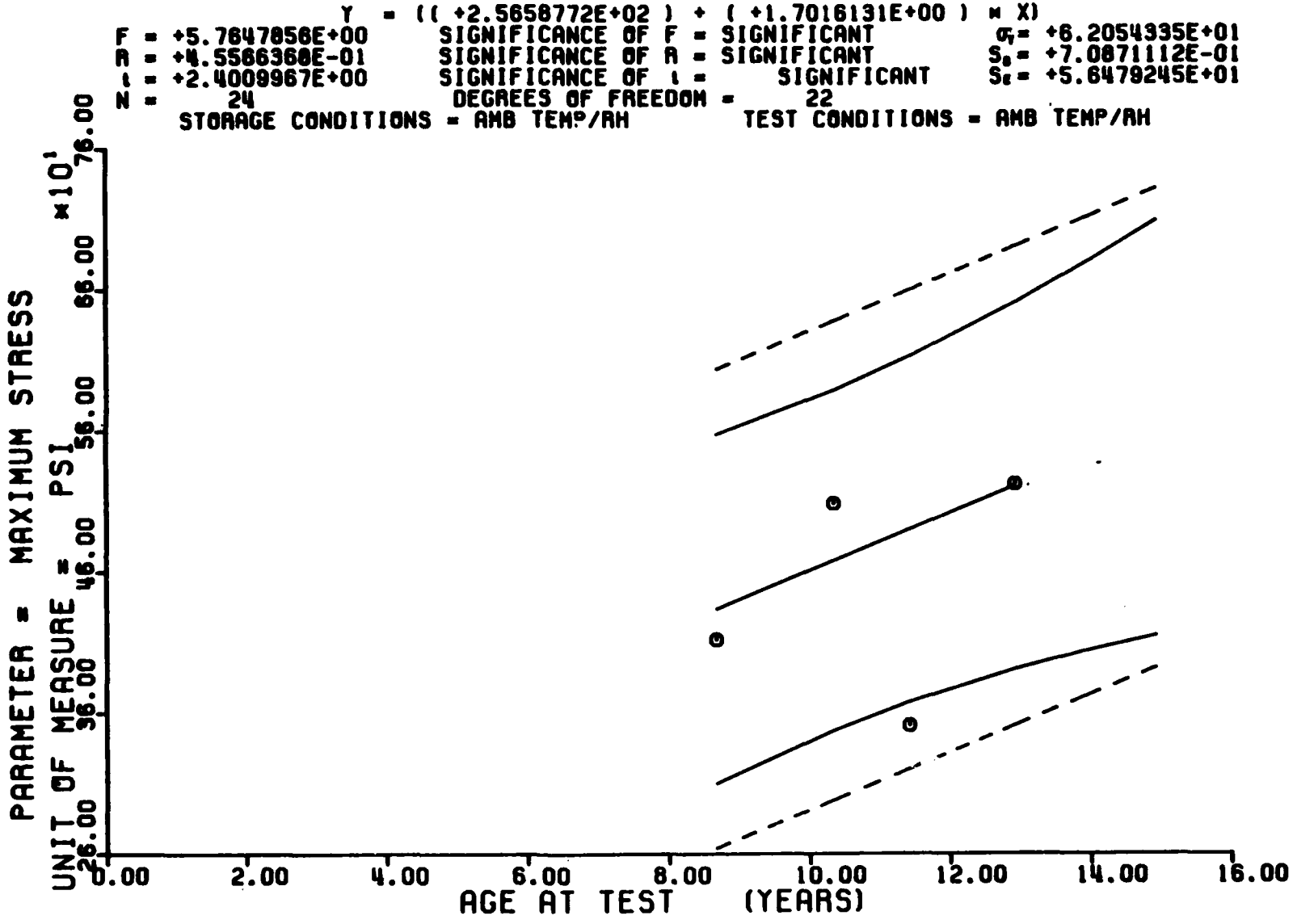

Y = ((+2.5658772E+02) + (+1.7016131E+00) x X)
F = +5.7647856E+00 SIGNIFICANCE OF F = SIGNIFICANT σ_Y = +6.2054335E+01
R = +4.5566368E-01 SIGNIFICANCE OF R = SIGNIFICANT S_B = +7.0871112E-01
t = +2.4009967E+00 SIGNIFICANCE OF t = SIGNIFICANT S_E = +5.6479245E+01
N = 24 DEGREES OF FREEDOM = 22
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI x10¹
76.00
66.00
56.00
46.00
36.00
26.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS, INNER, AXIAL, H.R.HYDRO. CHS=1750 AT 500 PSI, MAX STR <0022583>

Figure 91

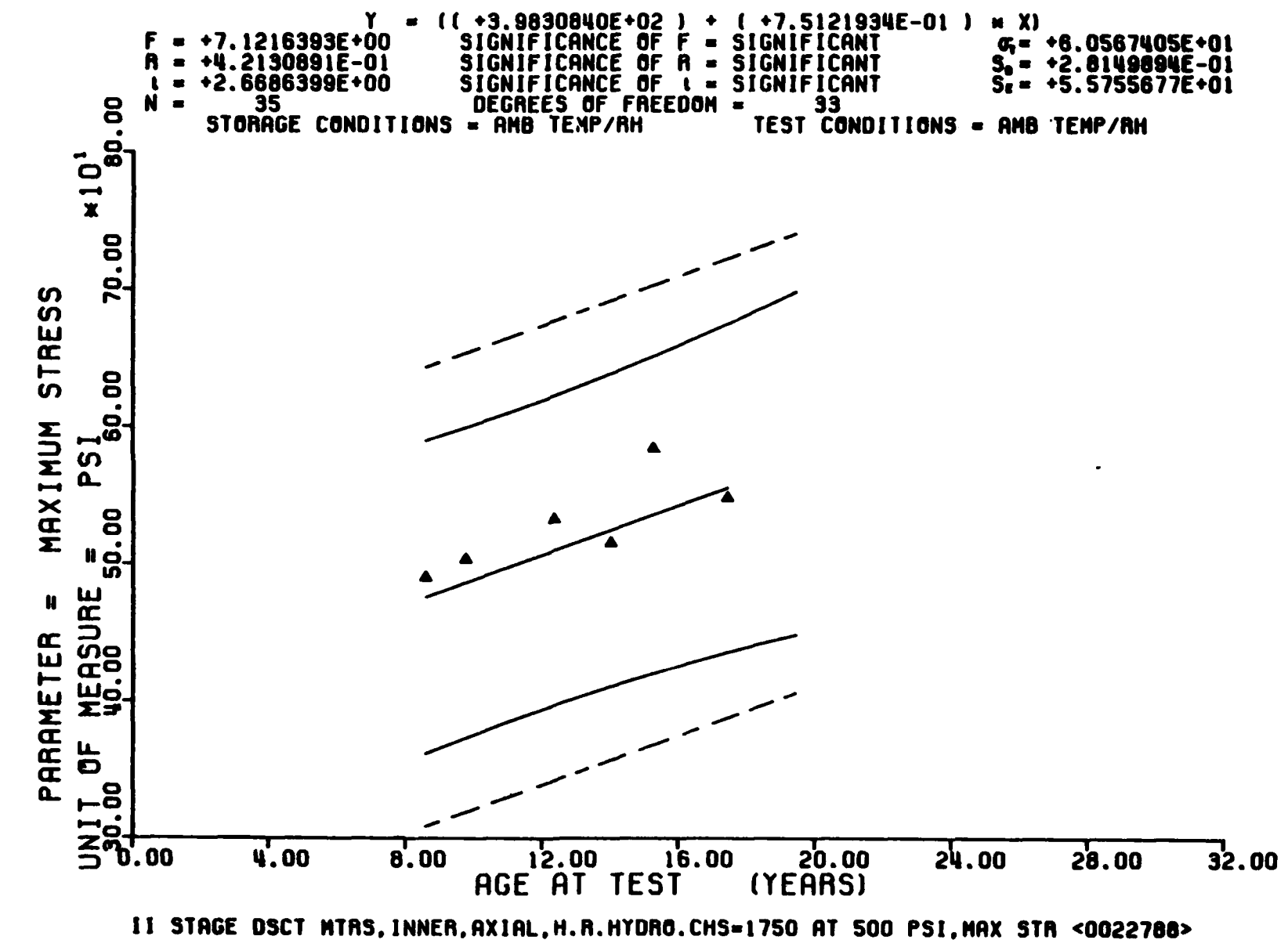

Y = ((+3.9830840E+02) + (+7.5121934E-01) * X)
F = +7.1216393E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +4.2130891E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.6686399E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 35 DEGREES OF FREEDOM = 33
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
30.00
40.00
50.00
60.00
70.00
80.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS, INNER, AXIAL, H.R.HYDRO. CHS=1750 AT 500 PSI, MAX STR <0022788>

Figure 92

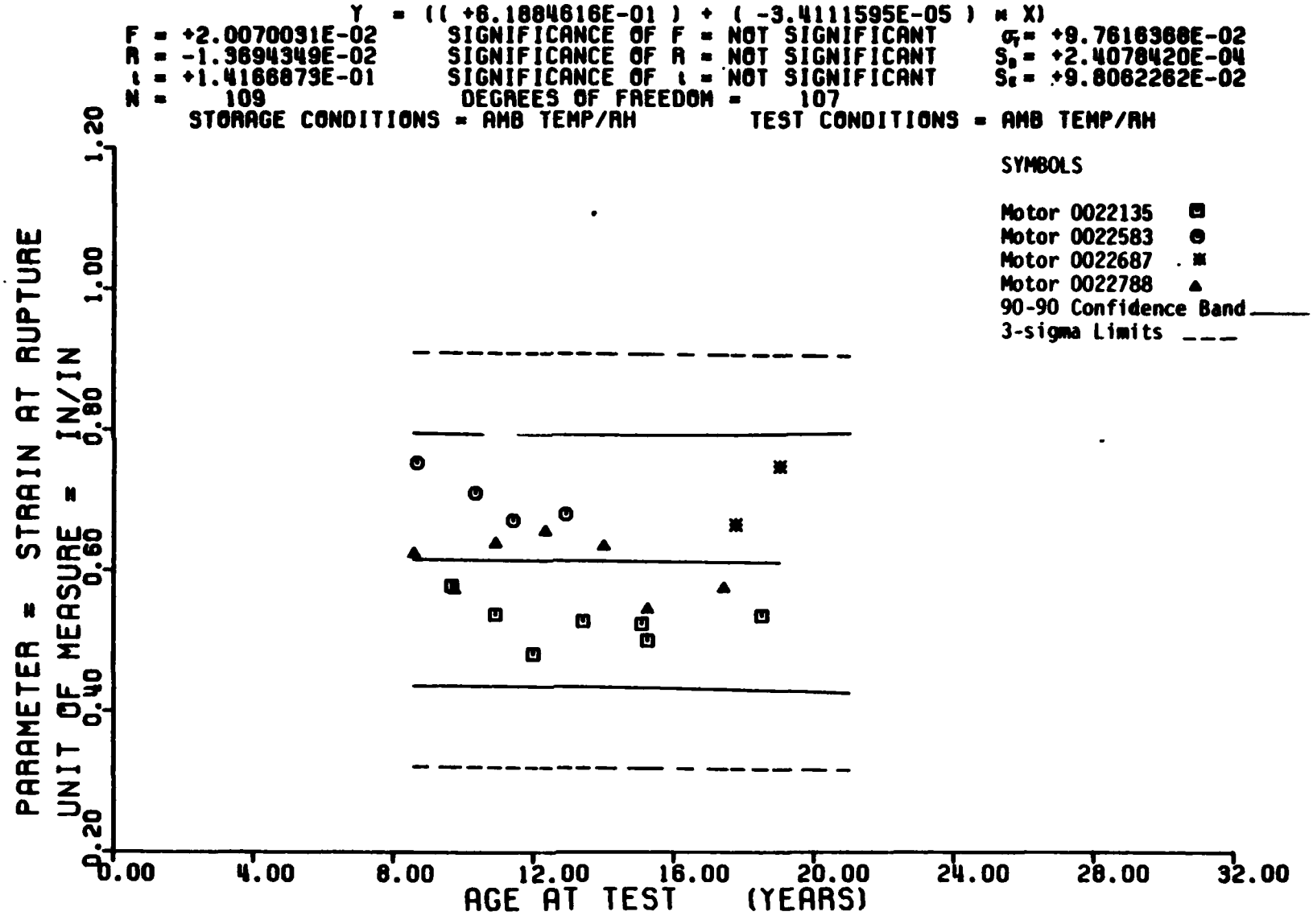

Y = ((+6.1884616E-01) + (-3.4111595E-05) * X)
F = +2.0070031E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT σ_Y = +9.7616368E-02
R = -1.3694349E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT S_B = +2.4078420E-04
t = +1.4166879E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT S_E = +9.8062262E-02
N = 109 DEGREES OF FREEDOM = 107
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.20
0.40
0.60
0.80
1.00
1.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,INNER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,STRAIN/RUPTURE

Figure 93

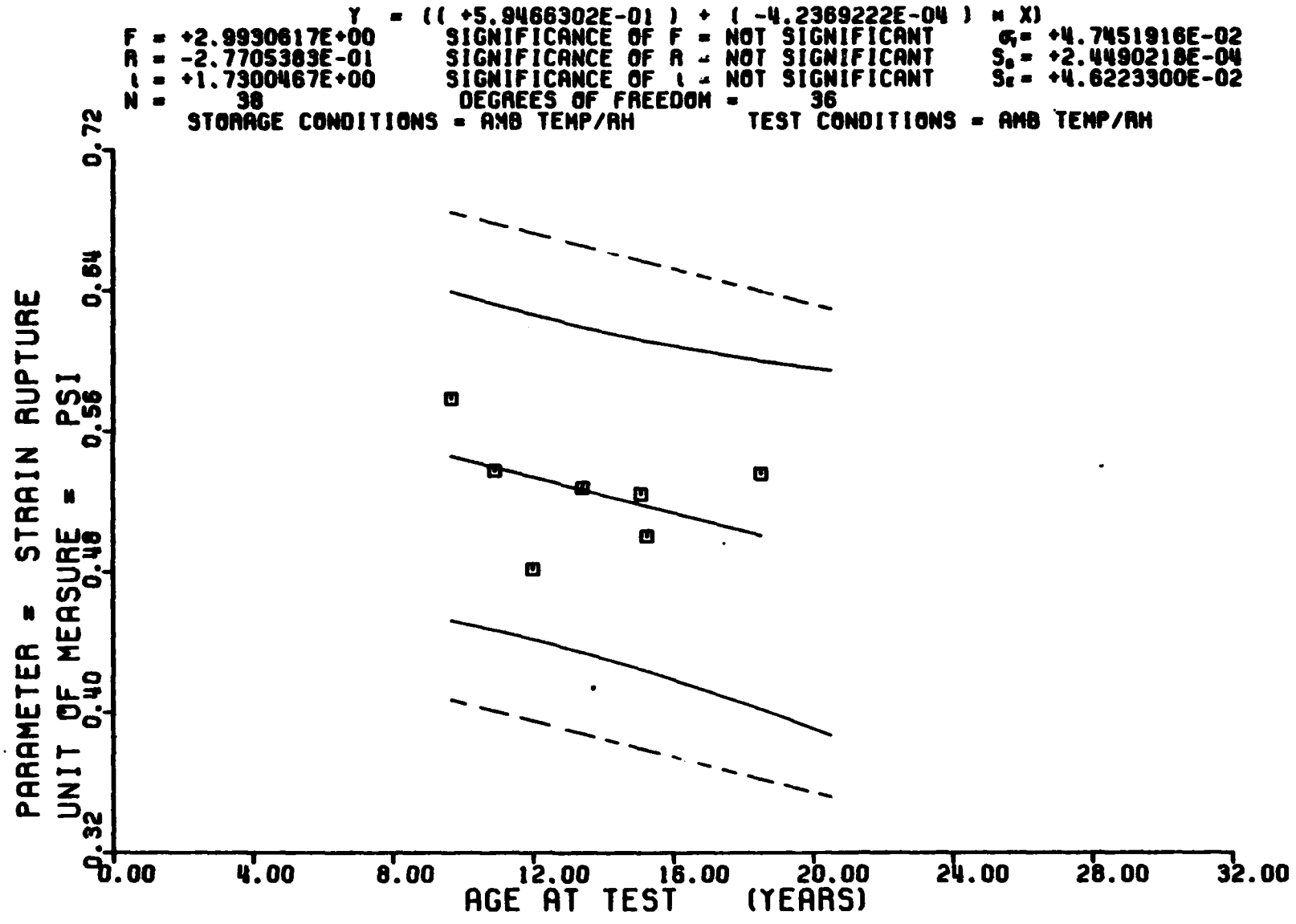

Y = ((+5.9466302E-01) + (-4.2369222E-04) * X)
F = +2.9930617E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σ1 = +4.7451916E-02
R = -2.7705383E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sa = +2.4490218E-04
t = +1.7300467E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +4.6223300E-02
N = 38 DEGREES OF FREEDOM = 36
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.72
0.64
0.56
0.48
0.40
0.32
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,INNER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,STN RUP <0022135>

Figure 94

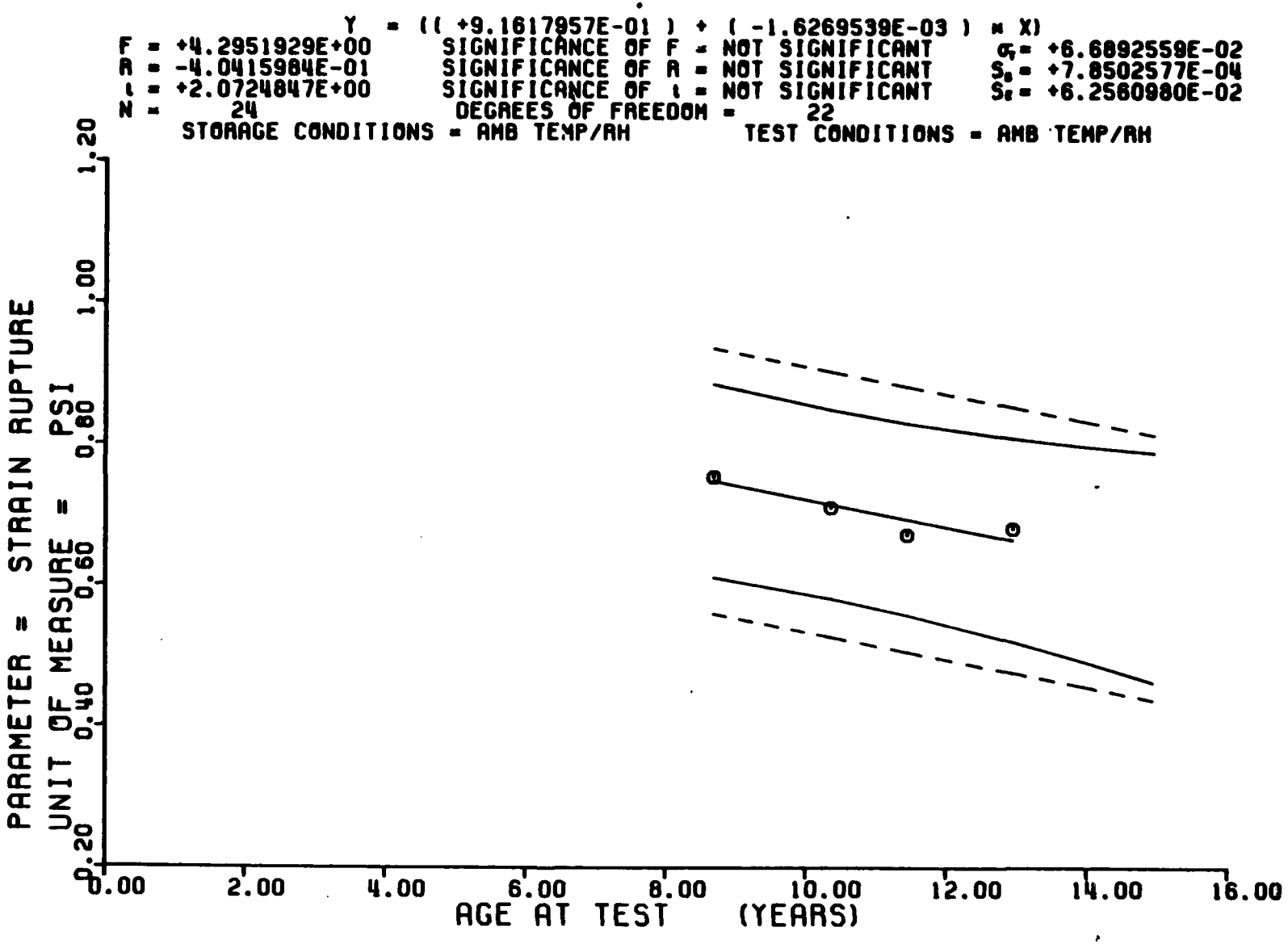

Y = ((+9.1617957E-01) + (-1.6269539E-03) * X)
F = +4.2951929E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +6.6892559E-02
R = -4.0415984E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +7.8502577E-04
t = +2.0724847E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sr = +6.2560980E-02
N = 24 DEGREES OF FREEDOM = 22
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS, INNER, AXIAL, H.R. HYDRO. CHS=1750 AT 500 PSI, STN RUP <0022583>

Figure 95

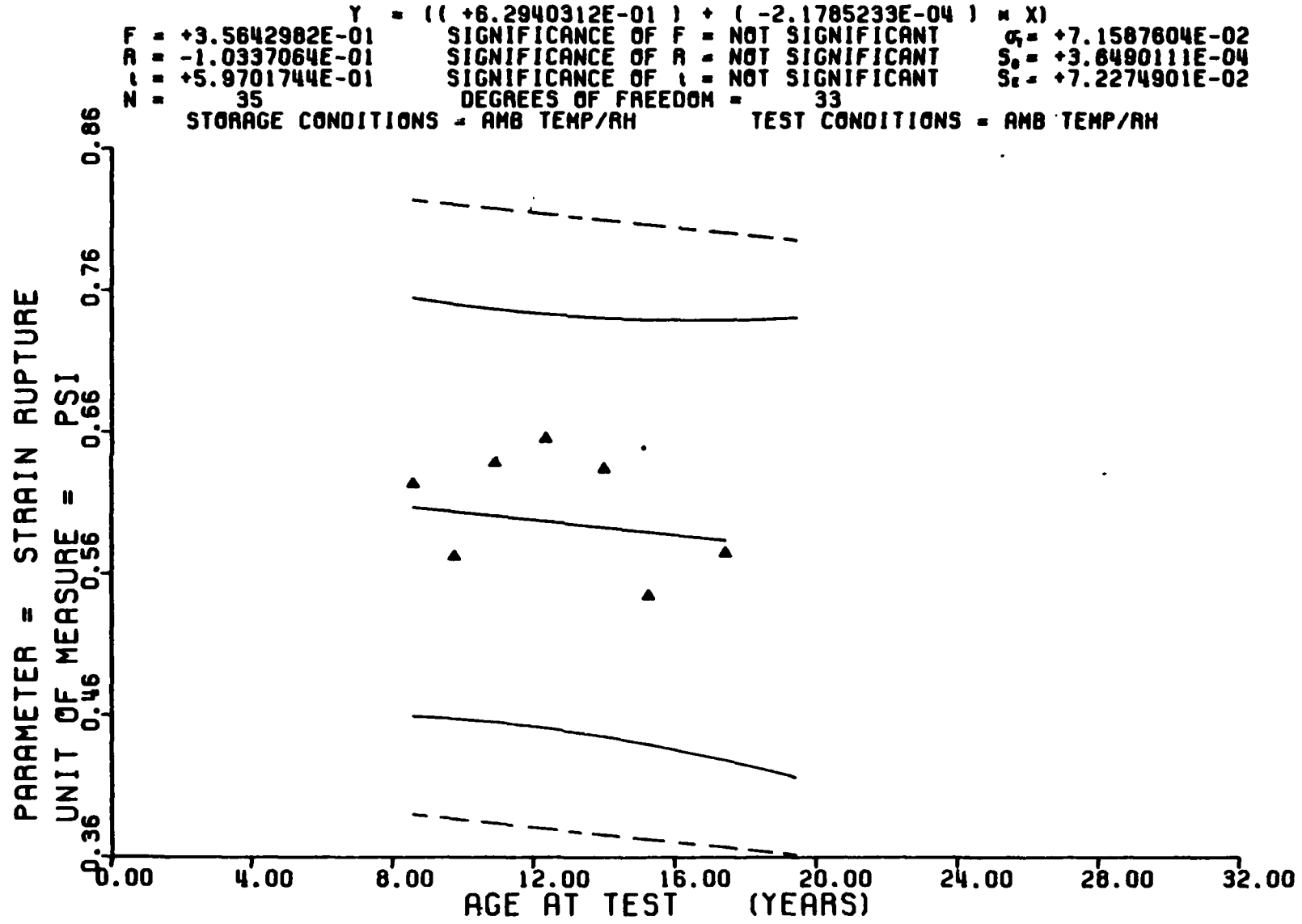
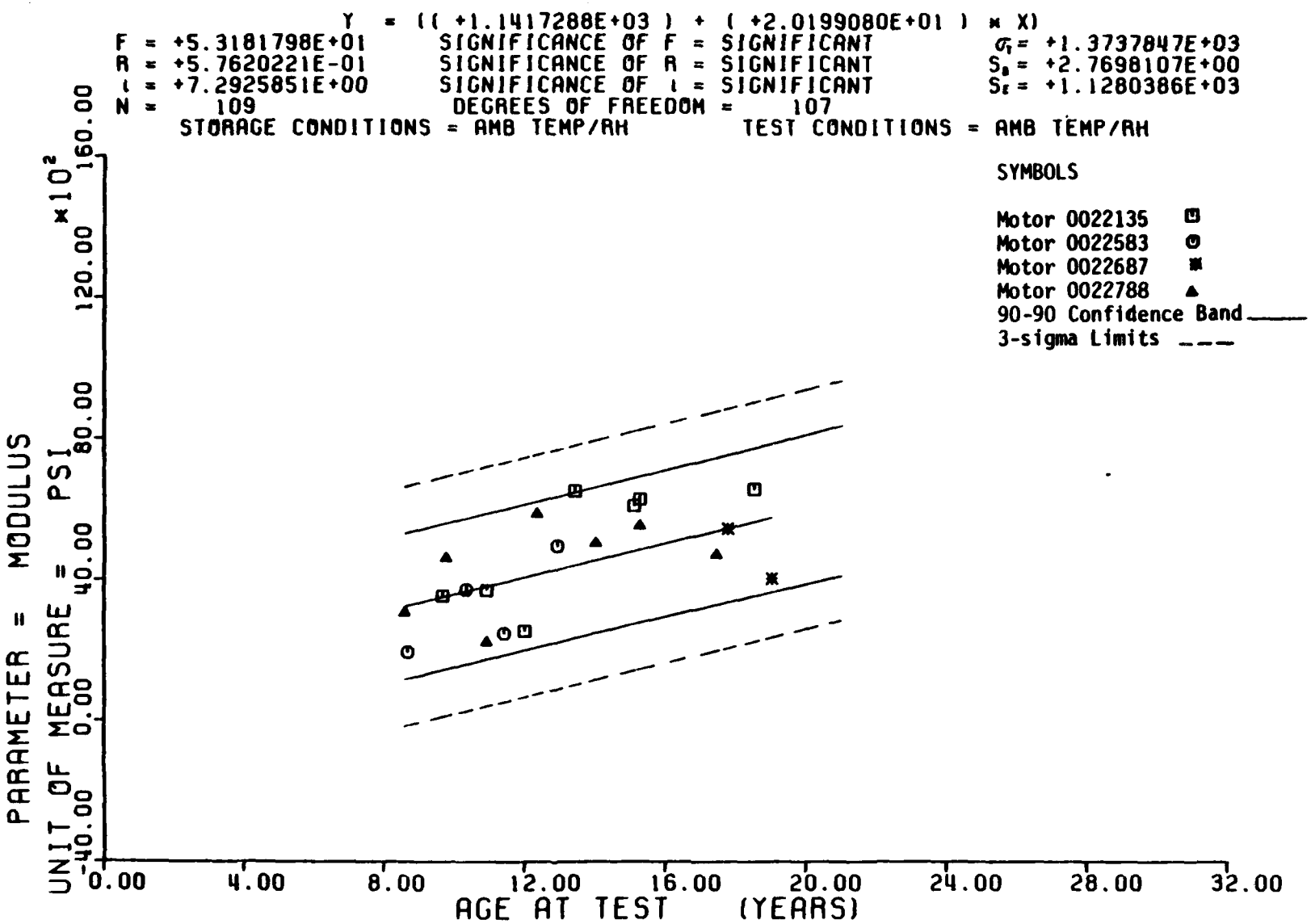

Y = ((+6.2940312E-01) + (-2.1785233E-04) * X)
F = +3.5642982E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +7.1587604E-02
A = -1.0337064E-01 SIGNIFICANCE OF A = NOT SIGNIFICANT Se = +3.6490111E-04
t = +5.9701744E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT St = +7.2274901E-02
N = 35 DEGREES OF FREEDOM = 33
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.86
0.76
0.66
0.56
0.46
0.36
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,INNER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,STN RUP <0022788>

Figure 96



II STAGE DSCT MTRS, INNER, AXIAL, H.R. HYDRO. CHS=1750 AT 500 PSI, MODULUS

Figure 97

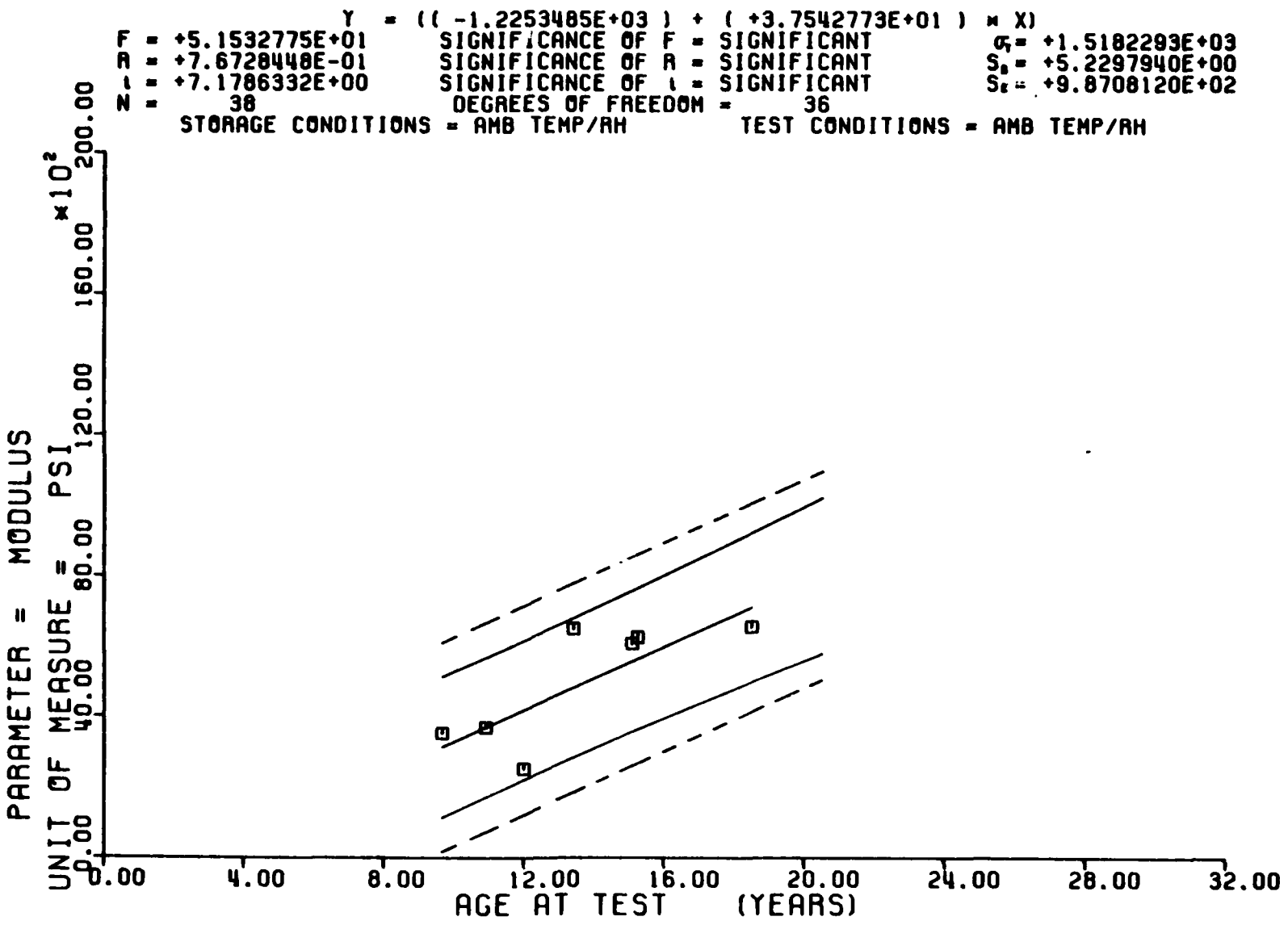

Y = ((-1.2253485E+03) + (+3.7542773E+01) * X)
F = +5.1532775E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +7.6728448E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +7.1786332E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 38 DEGREES OF FREEDOM = 36
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
*10²
200.00
160.00
120.00
80.00
40.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS, INNER, AXIAL, H.A.HYDRO. CHS=1750 AT 500 PSI, MODULUS <0022135>

Figure 98

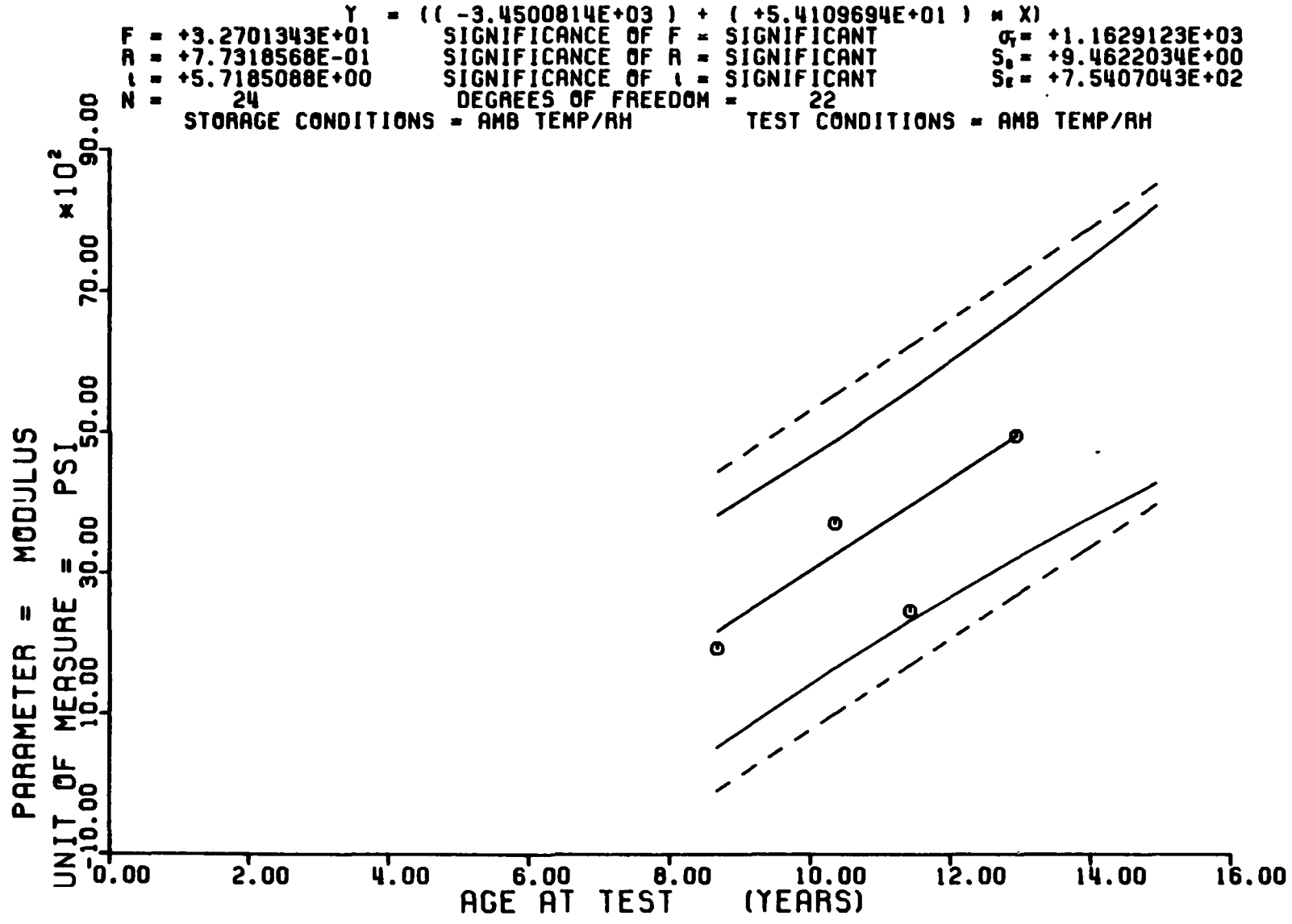

Y = ((-3.4500814E+03) + (+5.4109694E+01) * X)
F = +3.2701343E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +7.7318568E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +5.7185088E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 24 DEGREES OF FREEDOM = 22
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI x10²
90.00
70.00
50.00
30.00
10.00
-10.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS,INNER,AXIAL,H.R.HYDRO.CHS=1750 AT 500 PSI,MODULUS <0022583>

Figure 99

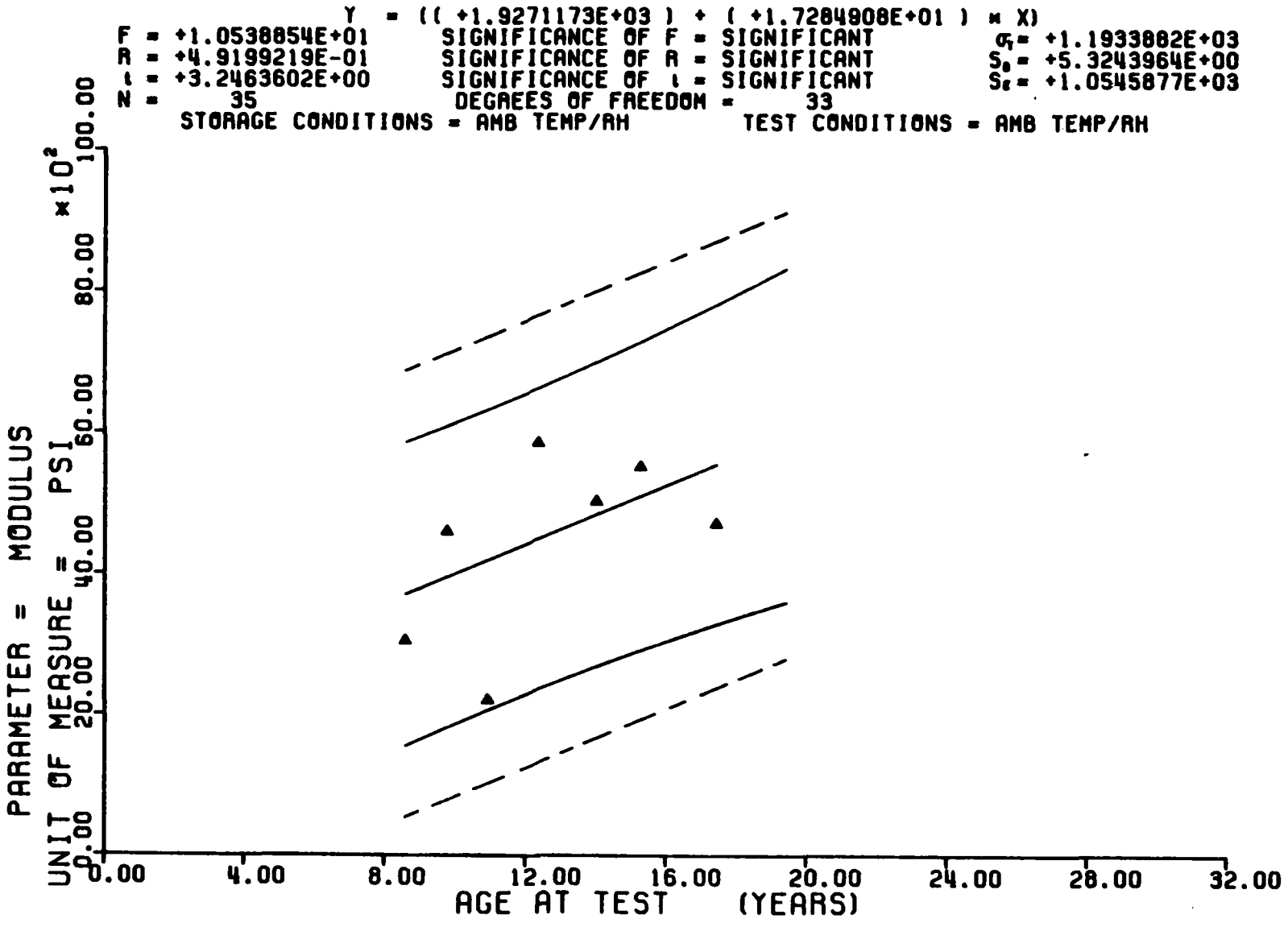

Y = ((+1.9271173E+03) + (+1.7284908E+01) * X)
F = +1.0538854E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +4.9199219E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +3.2463602E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 35 DEGREES OF FREEDOM = 33
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σ1 = +1.1933882E+03
S0 = +5.3243964E+00
Se = +1.0545877E+03
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
*10²
100.00
80.00
60.00
40.00
20.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS, INNER, AXIAL, H.R. HYDRO. CHS=1750 AT 500 PSI, MODULUS <0022788>

Figure 100

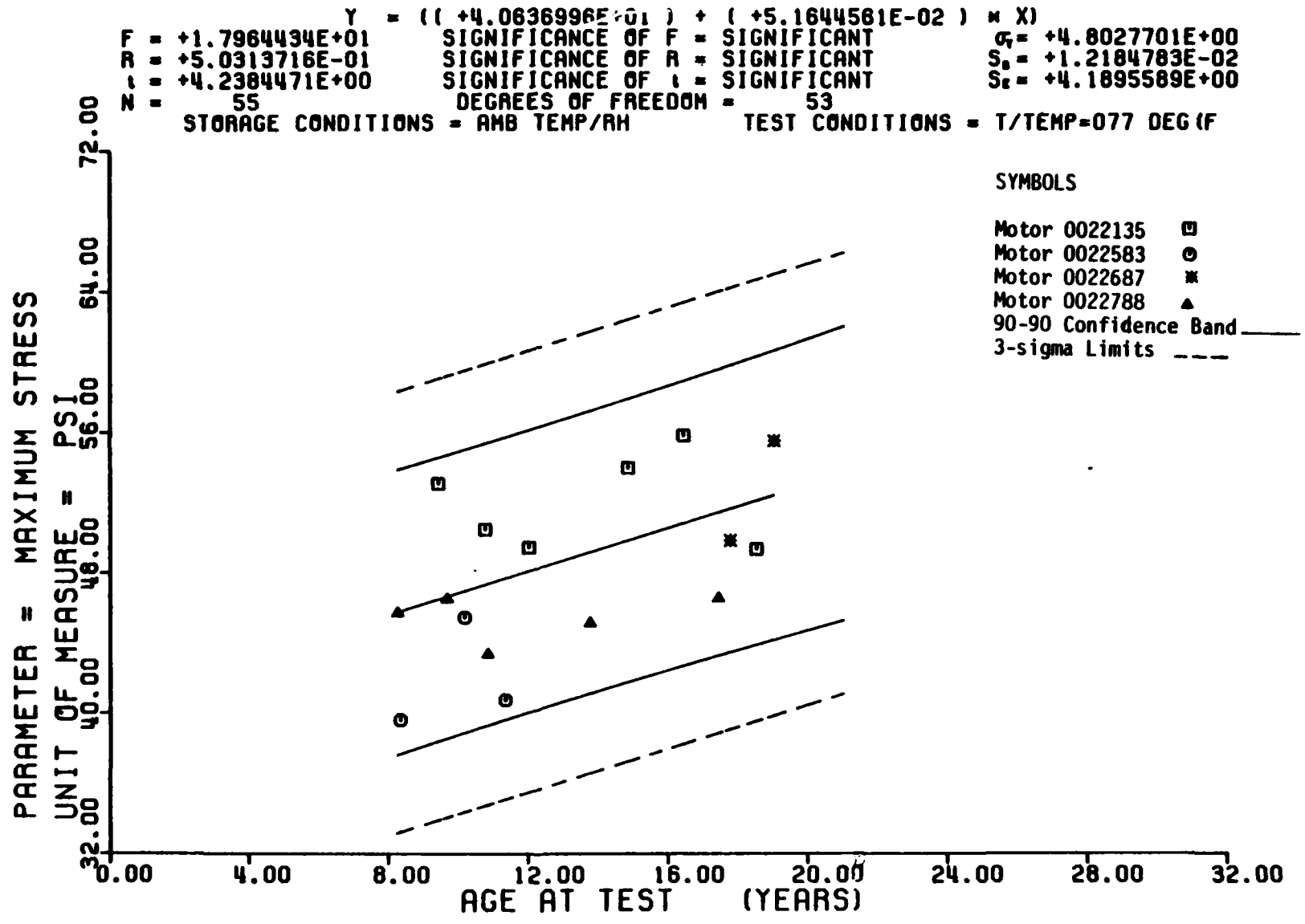

Y = ((+4.0636996E-01) + (+5.1644561E-02) * X)
F = +1.7964434E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +5.0313716E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +4.2384471E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 55 DEGREES OF FREEDOM = 53
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG(F
σy = +4.8027701E+00
Se = +1.2184783E-02
Sx = +4.1895589E+00
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
32.00
40.00
48.00
56.00
64.00
72.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCTED MTRS,CHS=0.0002 IN/MIN,INNER,CIRCUMF.ORIENT,77 DEG, MAX STRS.

Figure 101

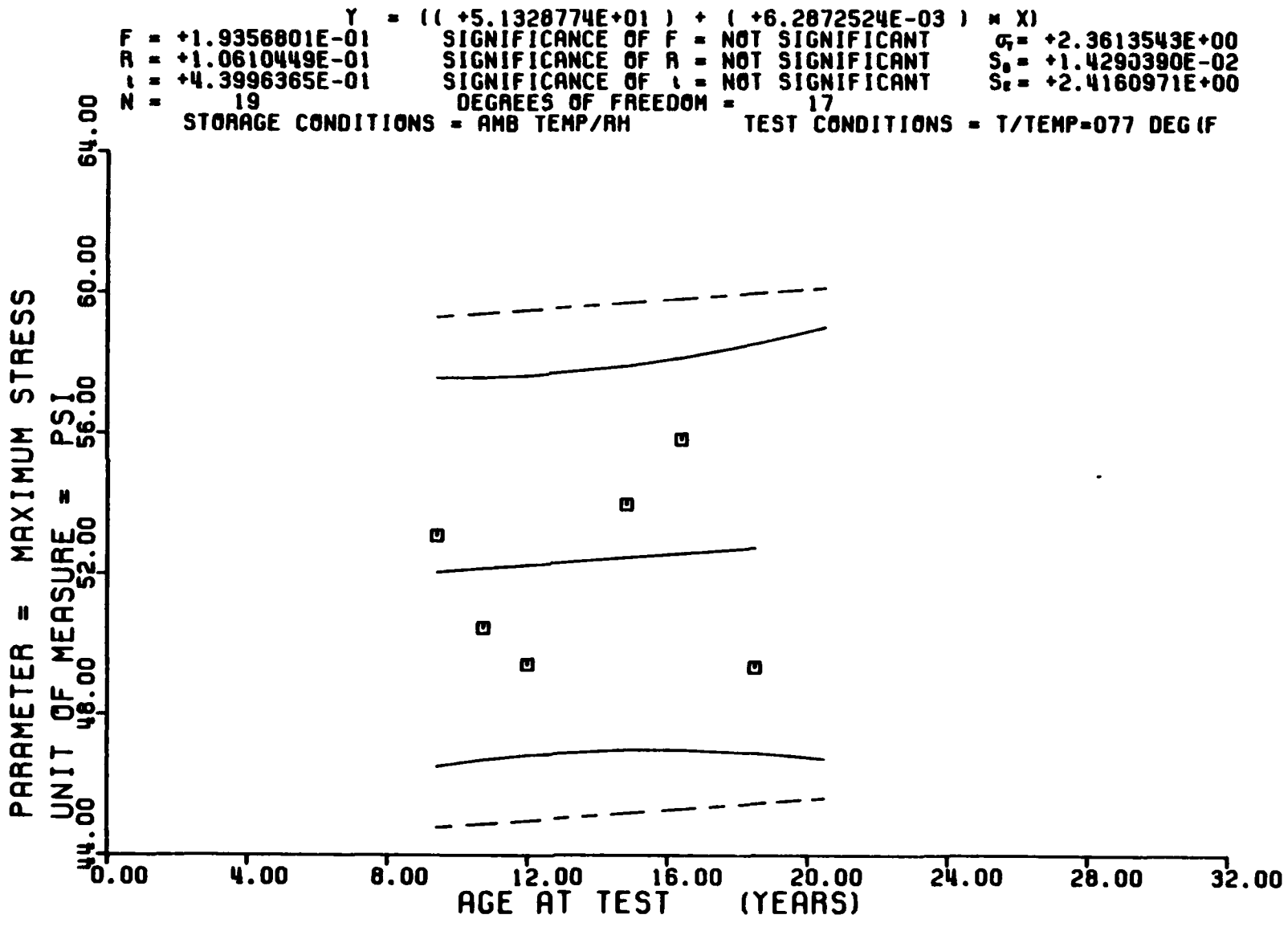

Y = ((+5.1328774E+01) + (+6.2872524E-03) * X)
F = +1.9356801E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σ = +2.3613543E+00
R = +1.0610449E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT S = +1.4290390E-02
t = +4.3996365E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT S = +2.4160971E+00
N = 19 DEGREES OF FREEDOM = 17
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG(F
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
64.00
60.00
56.00
52.00
48.00
44.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCTED MTRS,CHS=0.0002 ,INNER,CIRCUMF.ORIENT,77 DEG,MAX STR <0022135>

Figure 102

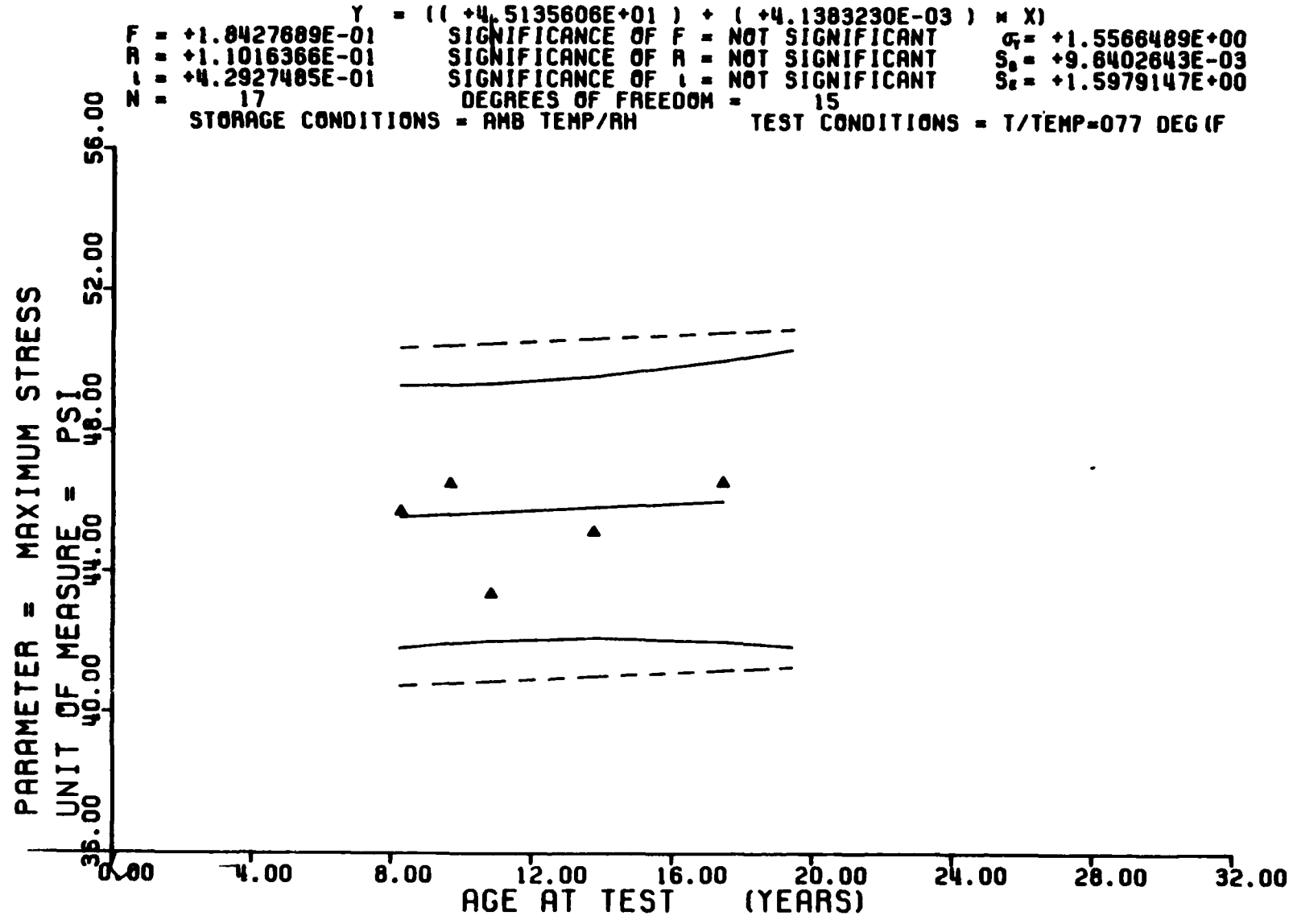

Y = ((+4.5135606E+01) + (+4.1383230E-03) * X)
F = +1.8427689E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σT = +1.5566489E+00
R = +1.1016366E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +9.6402643E-03
ι = +4.2927485E-01 SIGNIFICANCE OF ι = NOT SIGNIFICANT Sε = +1.5979147E+00
N = 17 DEGREES OF FREEDOM = 15
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG (F
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
56.00
52.00
48.00
44.00
40.00
36.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCTED MTRS,CHS=0.0002 ,INNER,CIRCUMF.ORIENT,77 DEG,MAX STR <0022788>

Figure 103

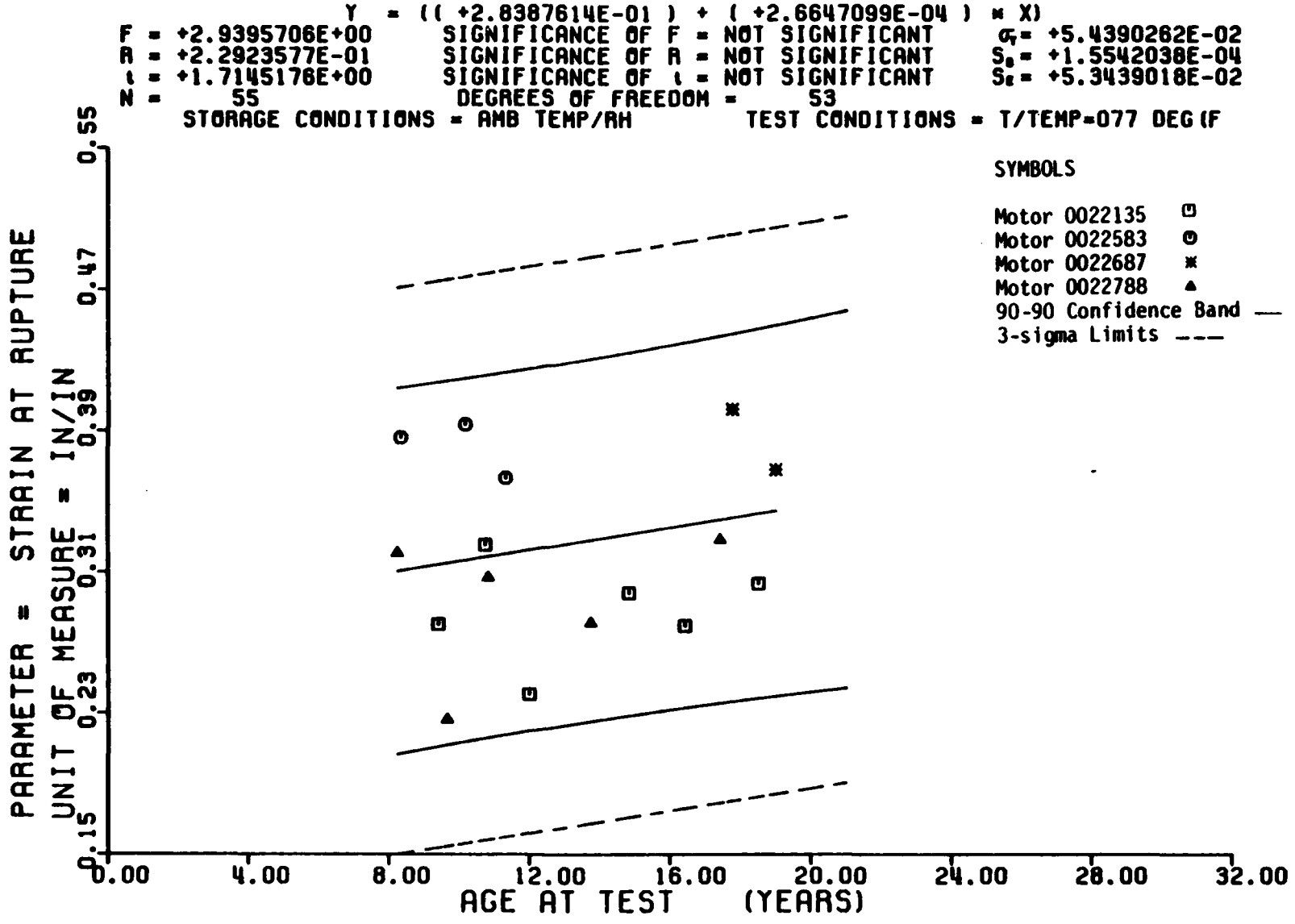

Y = ((+2.8387614E-01) + (+2.6647099E-04) * X)
F = +2.9395706E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σY = +5.4390262E-02
R = +2.2923577E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +1.5542038E-04
t = +1.7145176E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +5.3439018E-02
N = 55 DEGREES OF FREEDOM = 53
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG(F
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.15
0.23
0.31
0.39
0.47
0.55
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCTED MTRS,CHS=0.0002 IN/MIN,INNER,CIRCUMF.ORIENT,77 DEG, STRN/RUPT.

Figure 104

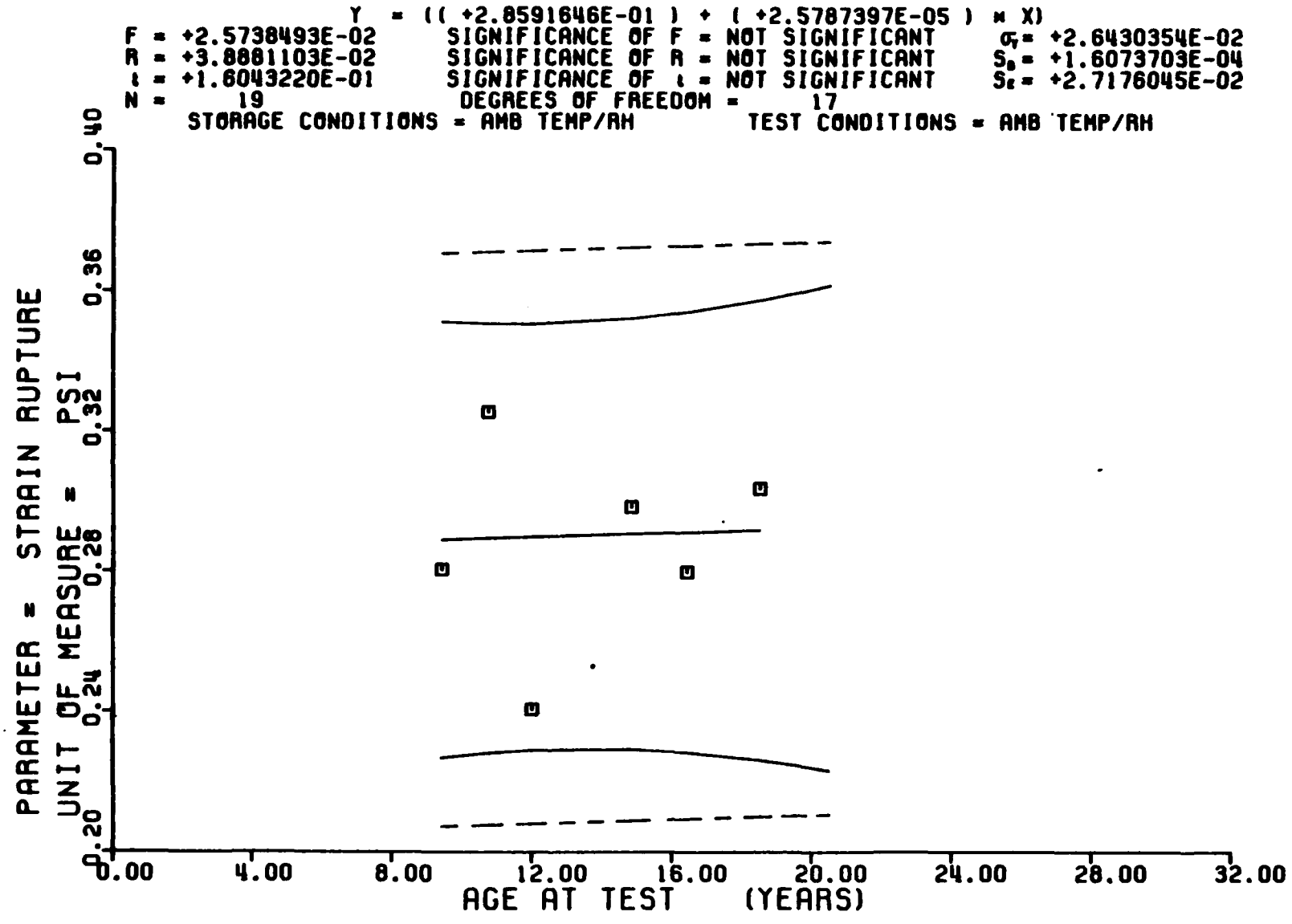

Y = ((+2.8591646E-01) + (+2.5787397E-05) * X)
F = +2.5738493E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT σ = +2.6430354E-02
R = +3.8881103E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT S = +1.6073703E-04
t = +1.6043220E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT S = +2.7176045E-02
N = 19 DEGREES OF FREEDOM = 17
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.40
0.36
0.32
0.28
0.24
0.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCTED MTRS,CHS=0.0002 ,INNER,CIRCUMF.ORIENT,77 DEG,STRN RUPT 0022135

Figure 105

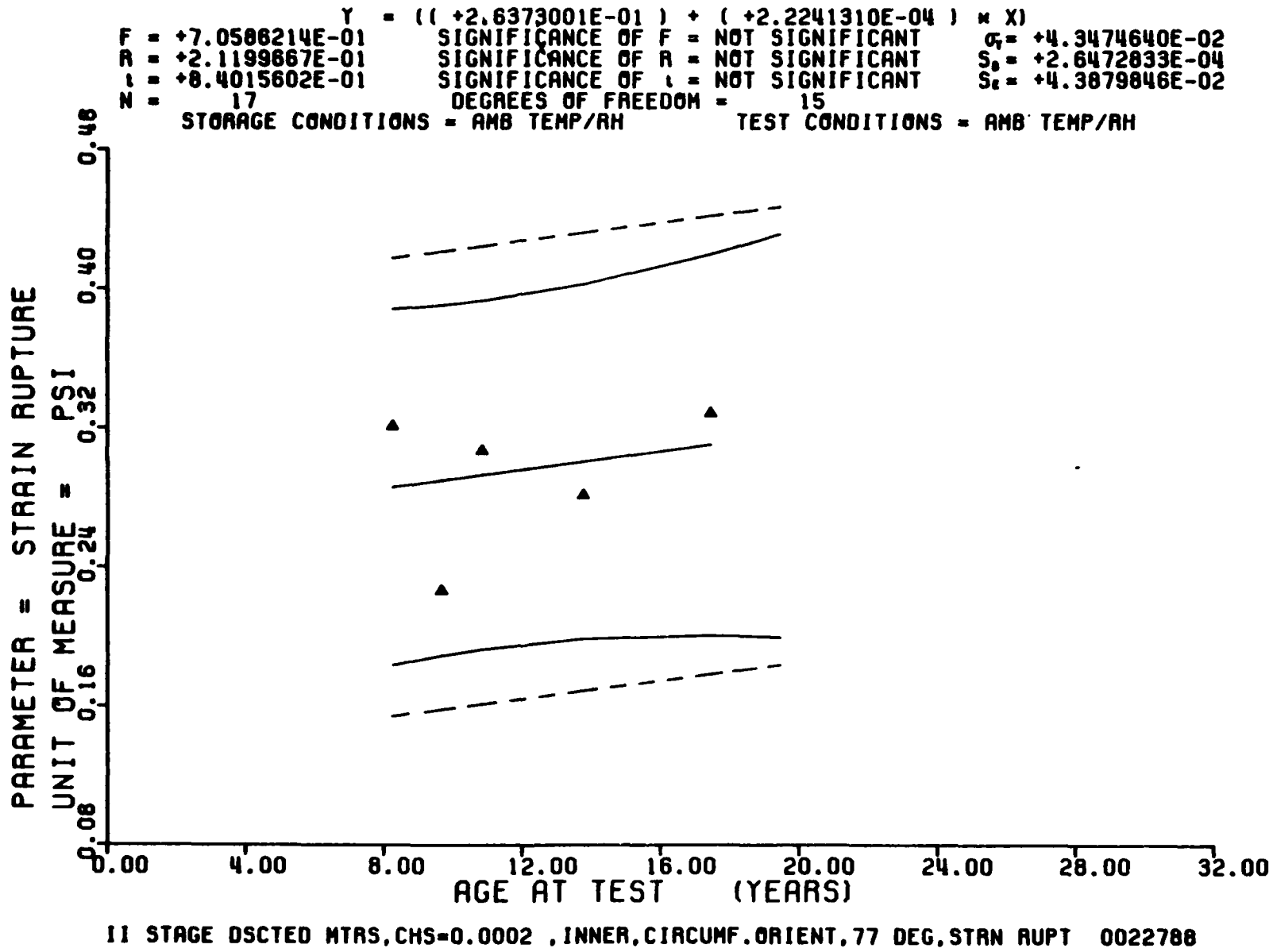

Y = ((+2.6373001E-01) + (+2.2241310E-04) * X)
F = +7.0586214E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σr= +4.3474640E-02
R = +2.1199867E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb= +2.6472833E-04
t = +8.4015602E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε= +4.3879846E-02
N = 17 DEGREES OF FREEDOM = 15
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.48
0.40
0.32
0.24
0.16
0.08
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCTED MTRS,CHS=0.0002 ,INNER,CIRCUMF.ORIENT,77 DEG,STRN RUPT 0022788

Figure 106

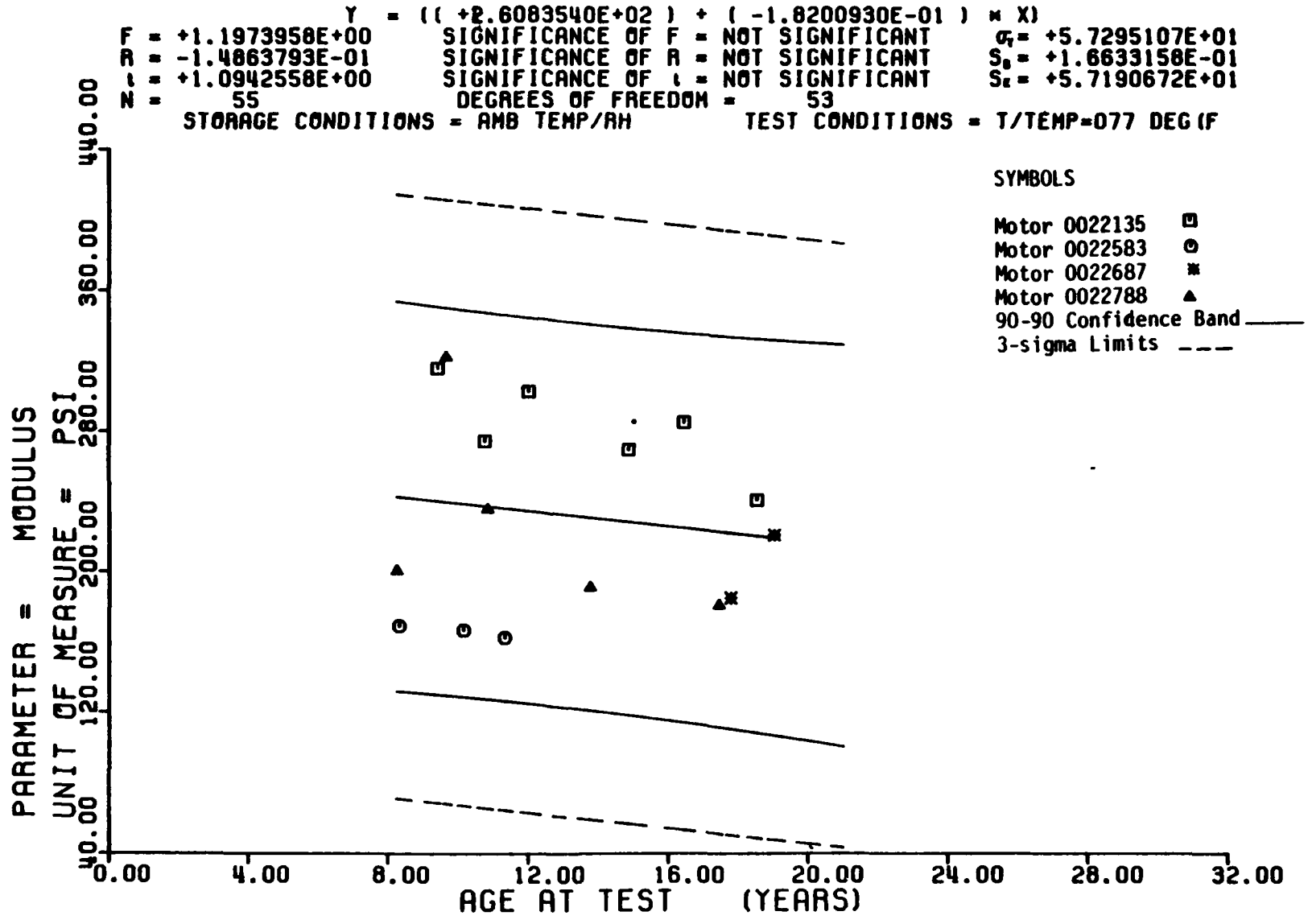

Y = ((+2.6083540E+02) + (-1.8200930E-01) * X)
F = +1.1973958E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +5.7295107E+01
R = -1.4863793E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sβ = +1.6633158E-01
t = +1.0942558E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +5.7190672E+01
N = 55 DEGREES OF FREEDOM = 53
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG (F
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
40.00
120.00
200.00
280.00
360.00
440.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCTED MTRS,CHS=0.0002 IN/MIN,INNER,CIRCUMF.ORIENT,77 DEG, MODULUS.

Figure 107

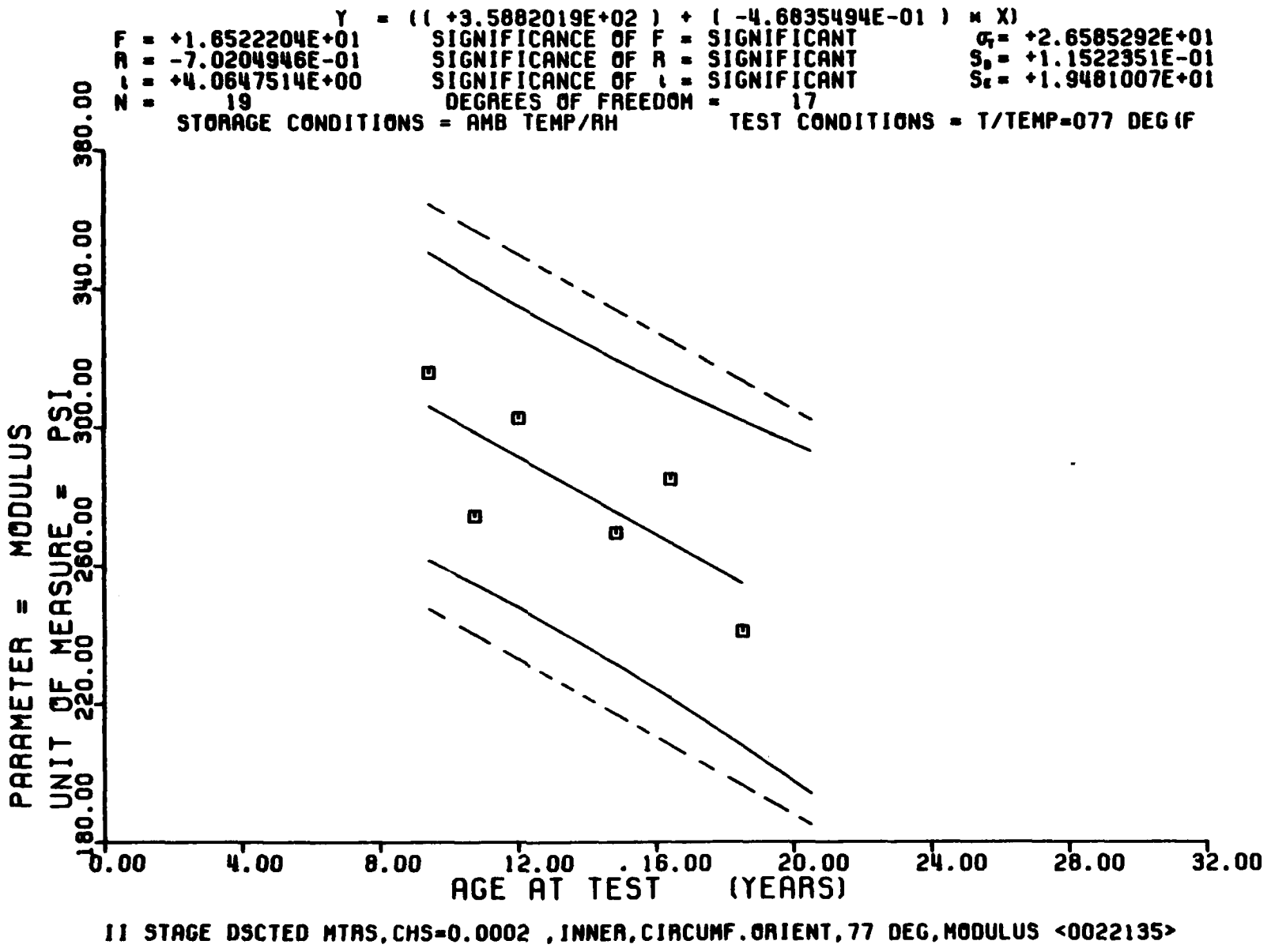

Y = ((+3.5882019E+02) + (-4.6835494E-01) x X)
F = +1.6522204E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = -7.0204946E-01 SIGNIFICANCE OF R = SIGNIFICANT
N = 19 DEGREES OF FREEDOM = 17
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = T/TEMP=077 DEG(F
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
380.00
340.00
300.00
260.00
220.00
180.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCTED MTRS,CHS=0.0002 ,INNER,CIRCUMF.ORIENT,77 DEG,MODULUS <0022135>

Figure 108

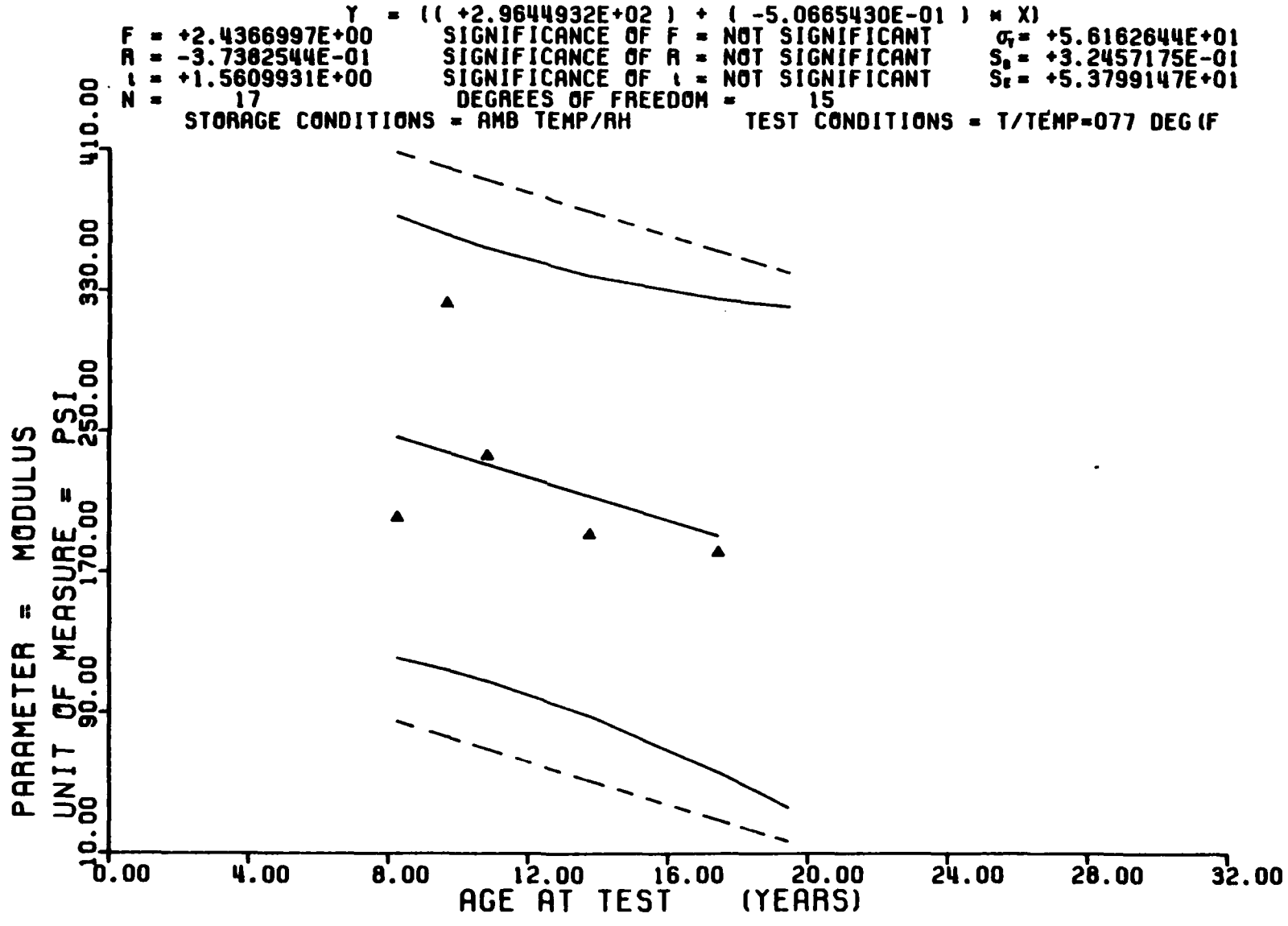
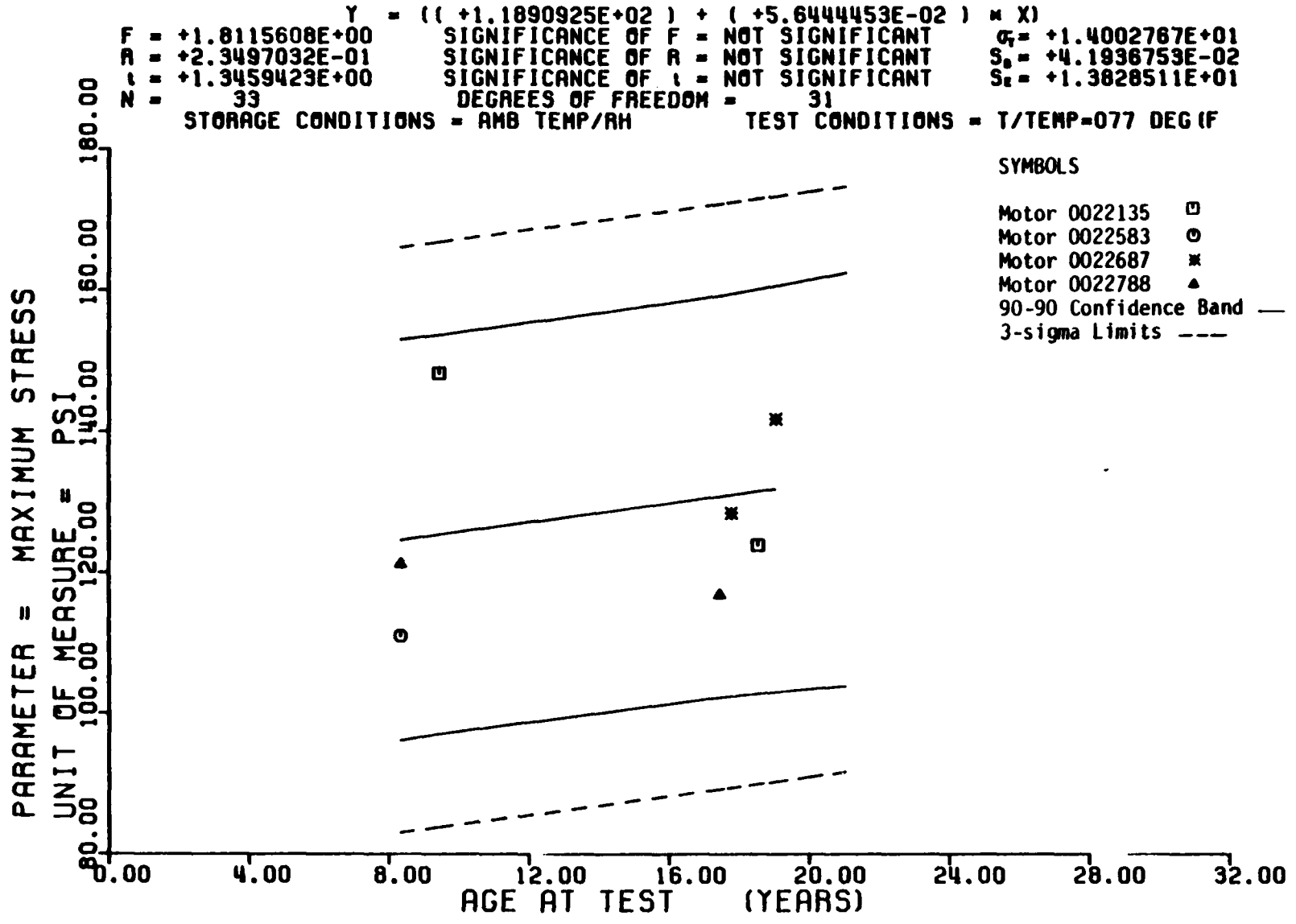

Y = ((+2.9644932E+02) + (-5.0665430E-01) * X)
F = +2.4366997E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +5.6162644E+01
R = -3.7382544E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Se = +3.2457175E-01
t = +1.5609931E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sr = +5.3799147E+01
N = 17 DEGREES OF FREEDOM = 15
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG (F
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
410.00
330.00
250.00
170.00
90.00
10.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCTED MTRS,CHS=0.0002 ,INNER,CIRCUMF.ORIENT,77 DEG,MODULUS <0022788>

Figure 109



II STAGE DSCTED MTRS, CHS=2.0 IN/MIN, INNER,CIRCUMF.ORIENT,77 DEG, MAX STRS.

Figure 110

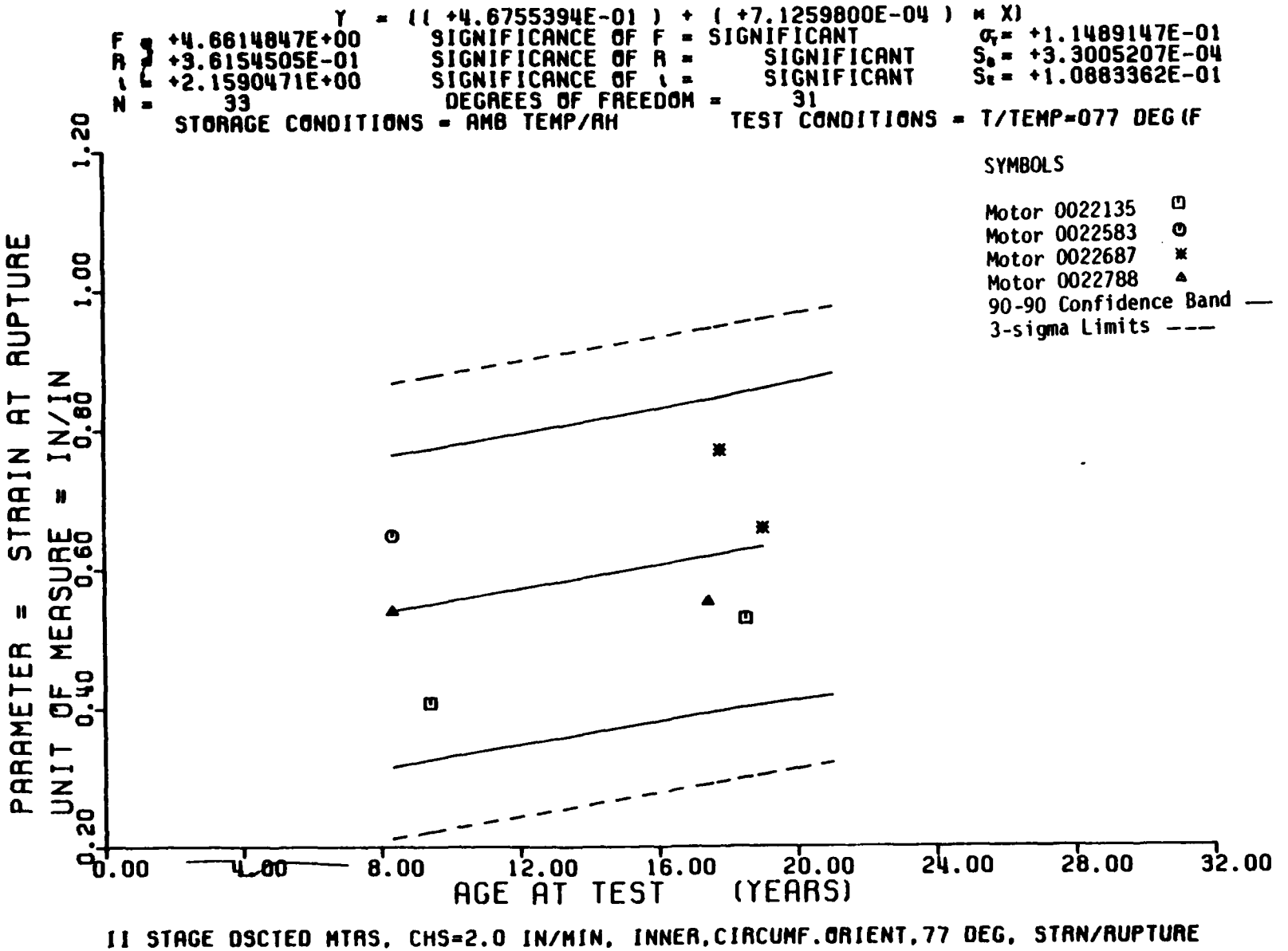
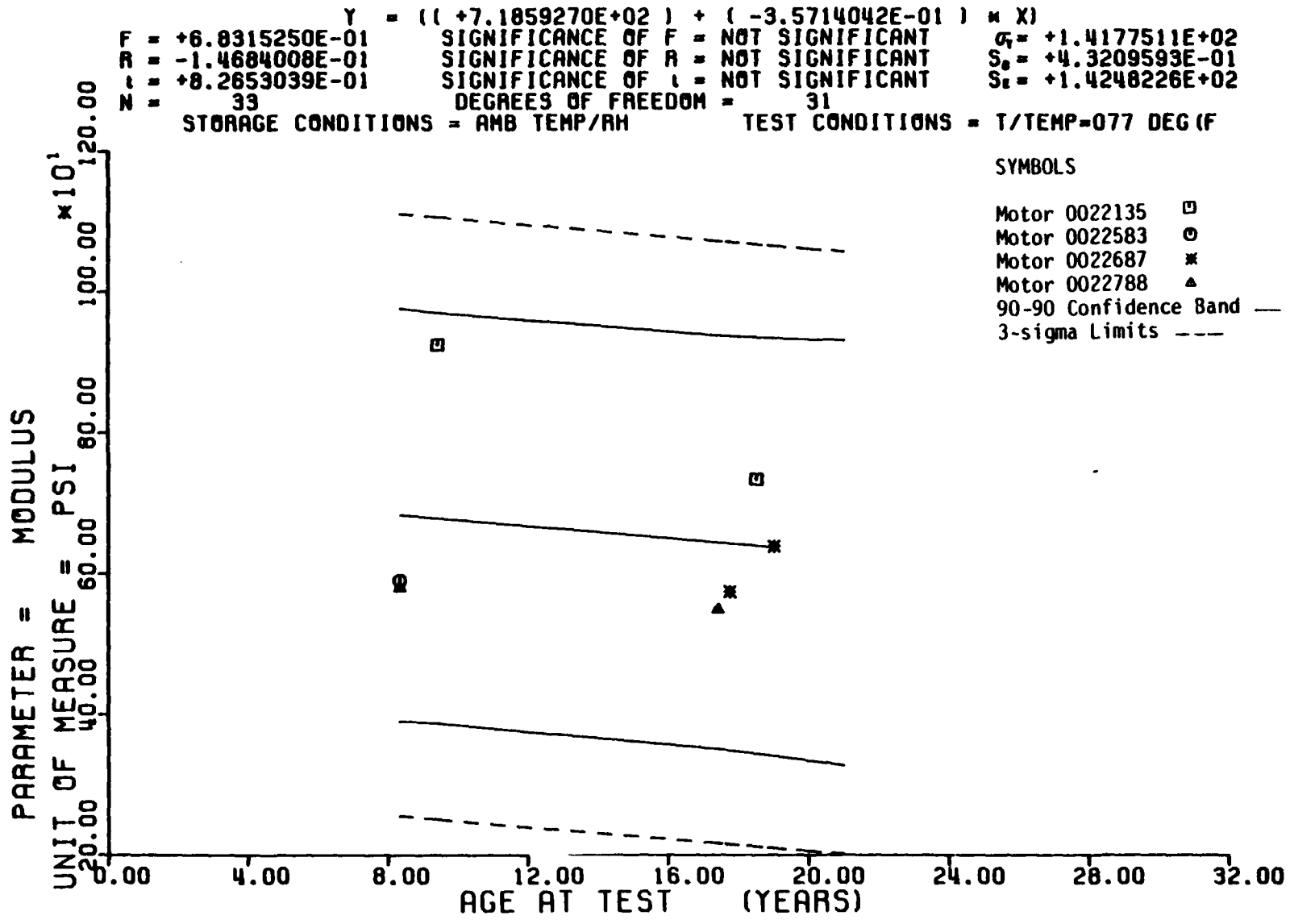

Y = ((+4.6755394E-01) + (+7.1259800E-04) * X)
F = +4.6614847E+00 SIGNIFICANCE OF F = SIGNIFICANT σr = +1.1489147E-01
R = +3.6154505E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +3.3005207E-04
t = +2.1590471E+00 SIGNIFICANCE OF t = SIGNIFICANT St = +1.0883362E-01
N = 33 DEGREES OF FREEDOM = 31
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG (F
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.20
0.40
0.60
0.80
1.00
1.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCTED MTRS, CHS=2.0 IN/MIN, INNER,CIRCUMF.ORIENT,77 DEG, STRN/RUPTURE

Figure 111



II STAGE DSCTED MTRS, CHS=2.0 IN/MIN, INNER,CIRCUMF.ORIENT,77 DEG, MODULUS.

Figure 112

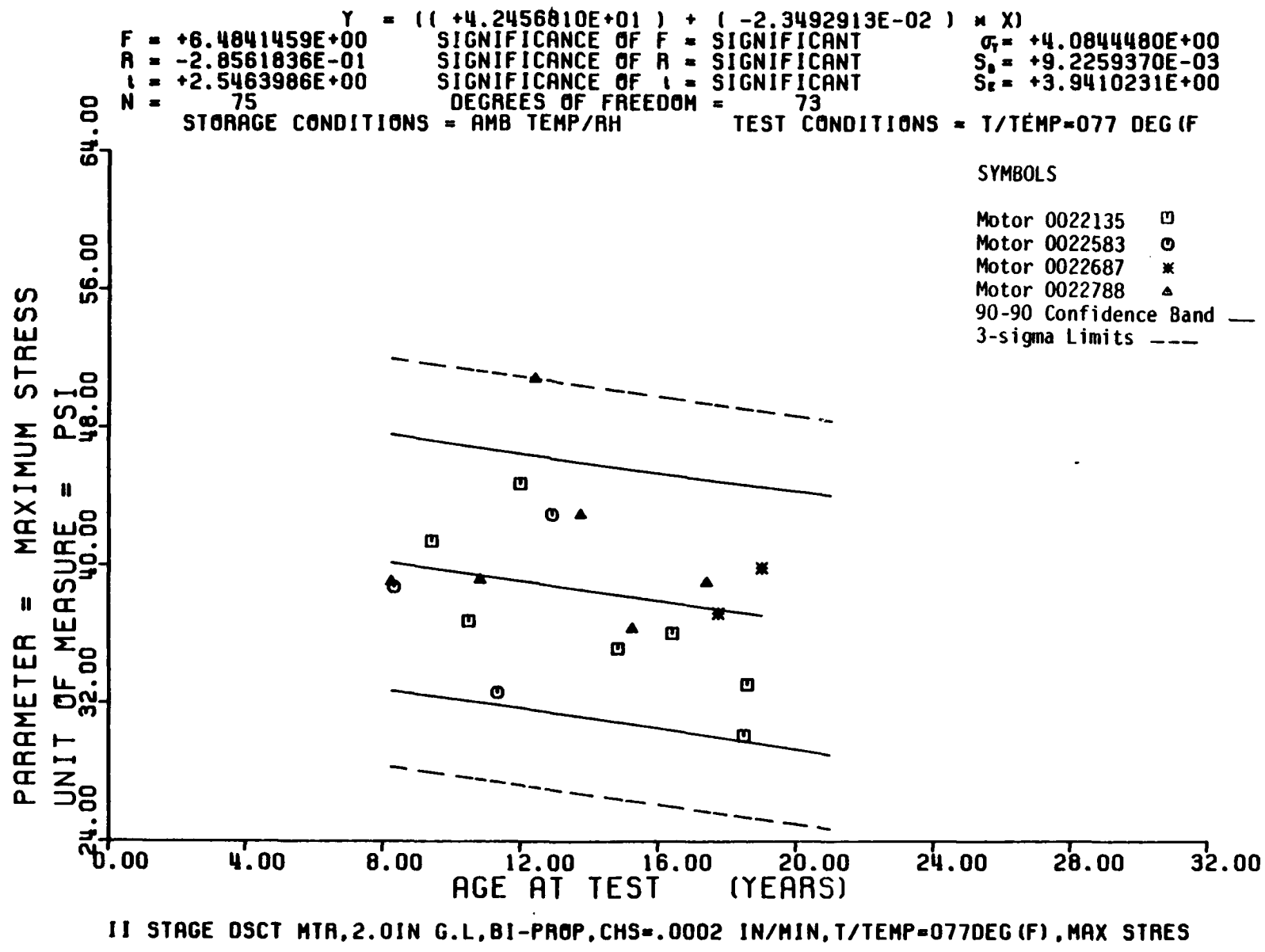

Y = ((+4.2456810E+01) + (-2.3492913E-02) * X)
F = +6.4841459E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = -2.8561836E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.5463986E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 75 DEGREES OF FREEDOM = 73
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = T/TEMP=077 DEG(F
σT = +4.0844480E+00
Se = +9.2259370E-03
St = +3.9410231E+00
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
64.00
56.00
48.00
40.00
32.00
24.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTR,2.0IN G.L,BI-PROP,CHS=.0002 IN/MIN,T/TEMP=077DEG(F),MAX STRES

Figure 113

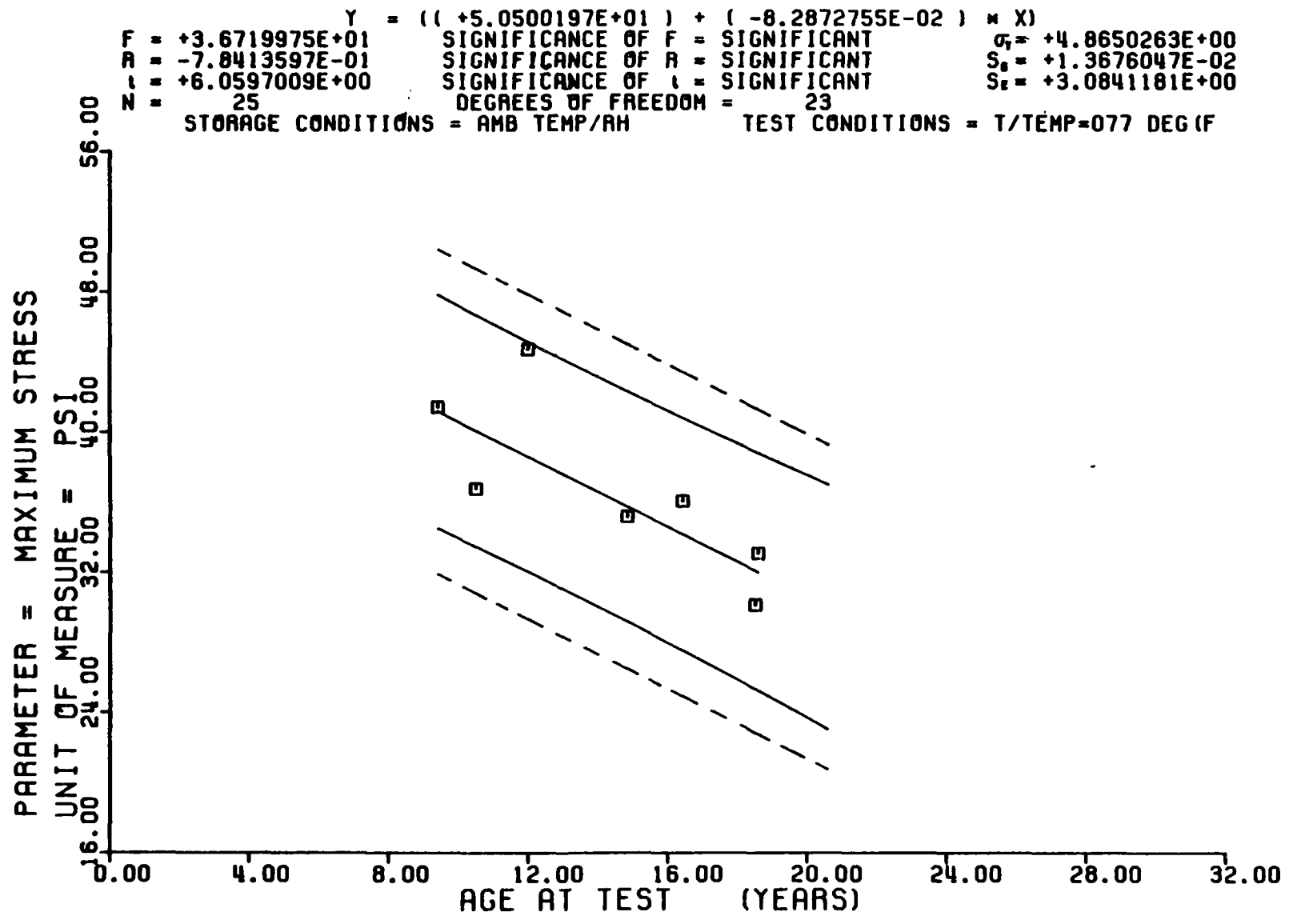

Y = ((+5.0500197E+01) + (-8.2872755E-02) * X)
F = +3.6719975E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = -7.8413597E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +6.0597009E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 25 DEGREES OF FREEDOM = 23
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = T/TEMP=077 DEG(F
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
16.00
24.00
32.00
40.00
48.00
56.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR,2.0IN G.L,BI-PROP,CHS=.0002,T/TEMP=077DEG(F),MAX STR<0022135

Figure 114

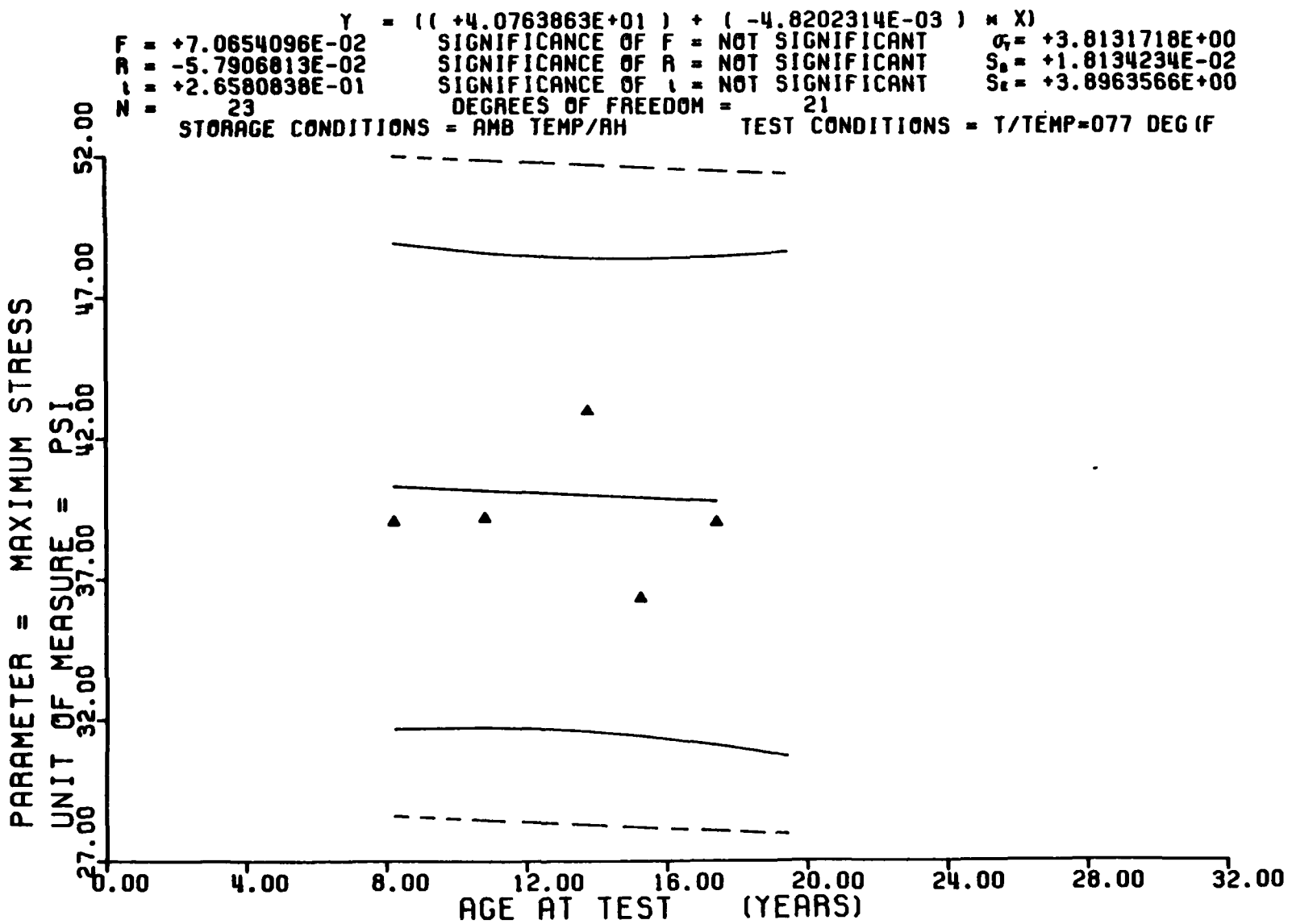

Y = ((+4.0763863E+01) + (-4.8202314E-03) * X)
F = +7.0654096E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +3.8131718E+00
R = -5.7906813E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +1.8134234E-02
t = +2.6580838E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +3.8963566E+00
N = 23 DEGREES OF FREEDOM = 21
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG (F
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
52.00
47.00
42.00
37.00
32.00
27.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR,2.0IN G.L,BI-PROP,CHS=.0002,T/TEMP=077DEG(F),MAX STR<0022788>

Figure 115

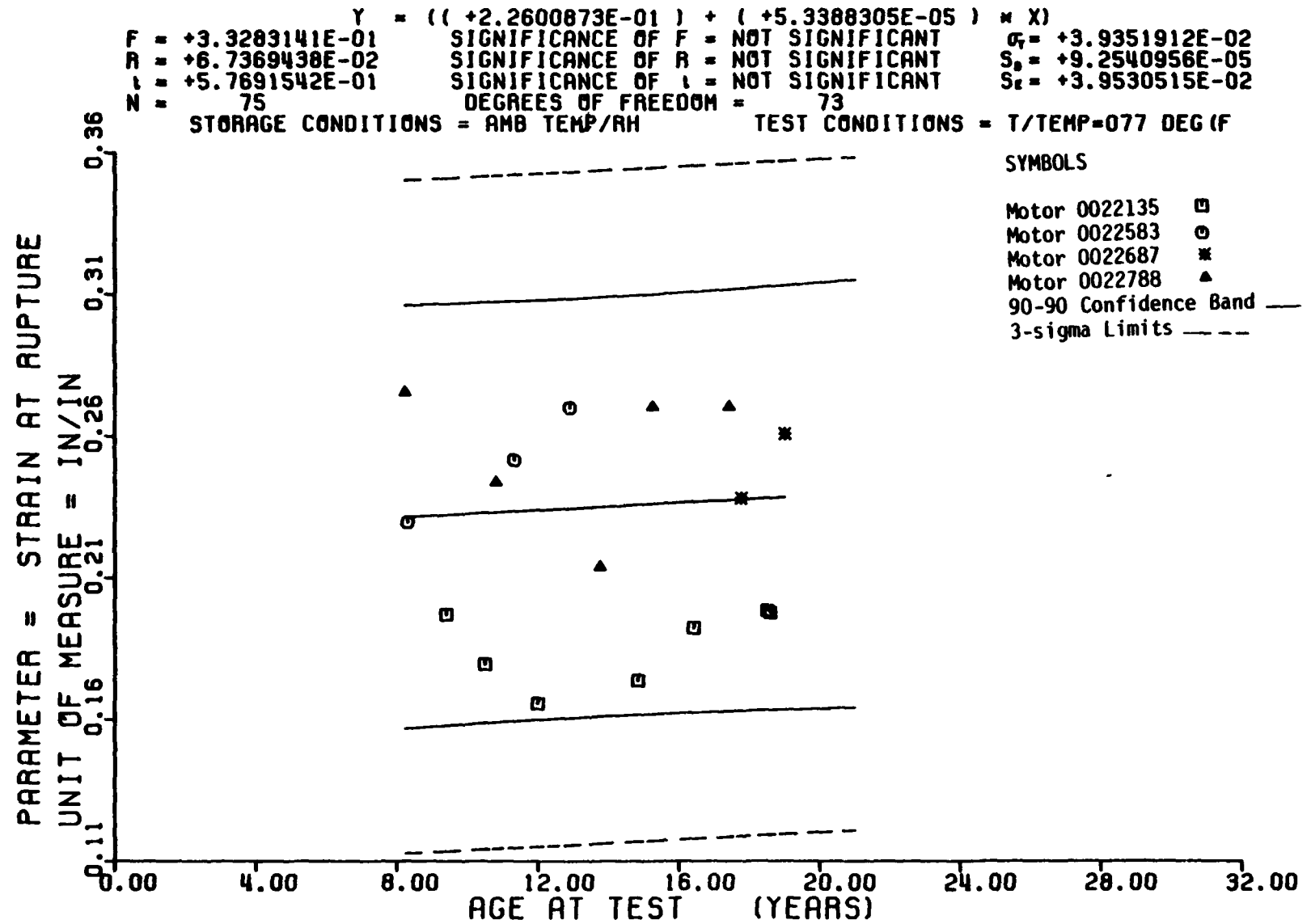

Y = ((+2.2600873E-01) + (+5.3388305E-05) * X)
F = +3.3283141E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT
R = +6.7369438E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT
t = +5.7691542E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT
N = 75 DEGREES OF FREEDOM = 73
σT = +3.9351912E-02
Se = +9.2540956E-05
Sε = +3.9530515E-02
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG(F
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.11
0.16
0.21
0.26
0.31
0.36
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR,2.0IN G.L,BI-PROP,CHS=.0002 IN/MIN,T/TEMP=077 DEG(F),STRN/RUP

Figure 116

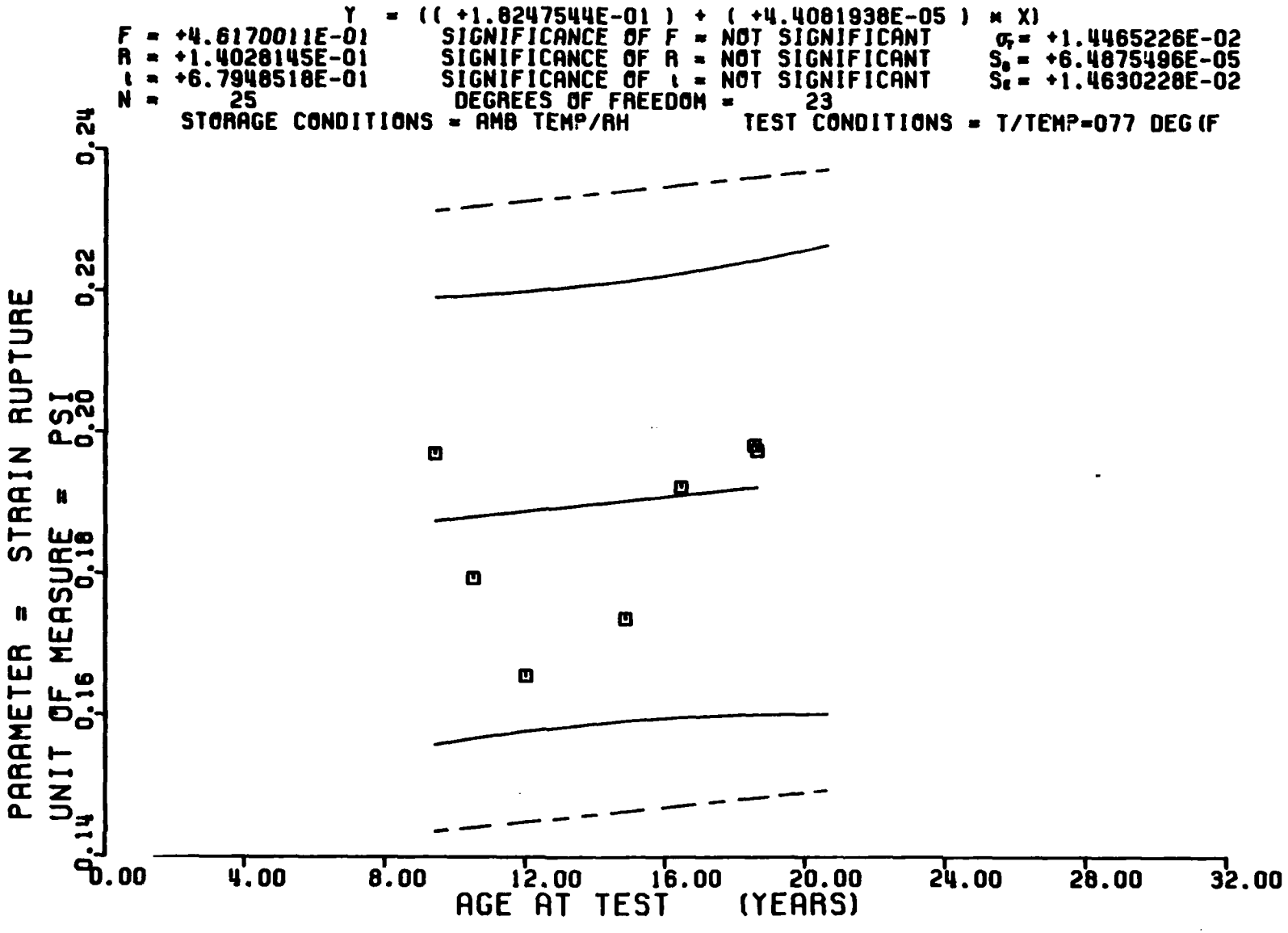

Y = ((+1.8247544E-01) + (+4.4081938E-05) * X)
F = +4.6170011E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +1.4465226E-02
R = +1.4028145E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +6.4875496E-05
t = +6.7948518E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +1.4630228E-02
N = 25 DEGREES OF FREEDOM = 23
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG(F
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.24
0.22
0.20
0.18
0.16
0.14
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR,2.0IN G.L,BI-PROP,CHS=.0002,T/TEMP=077DEG(F),STN RUP=.0022135

Figure 117

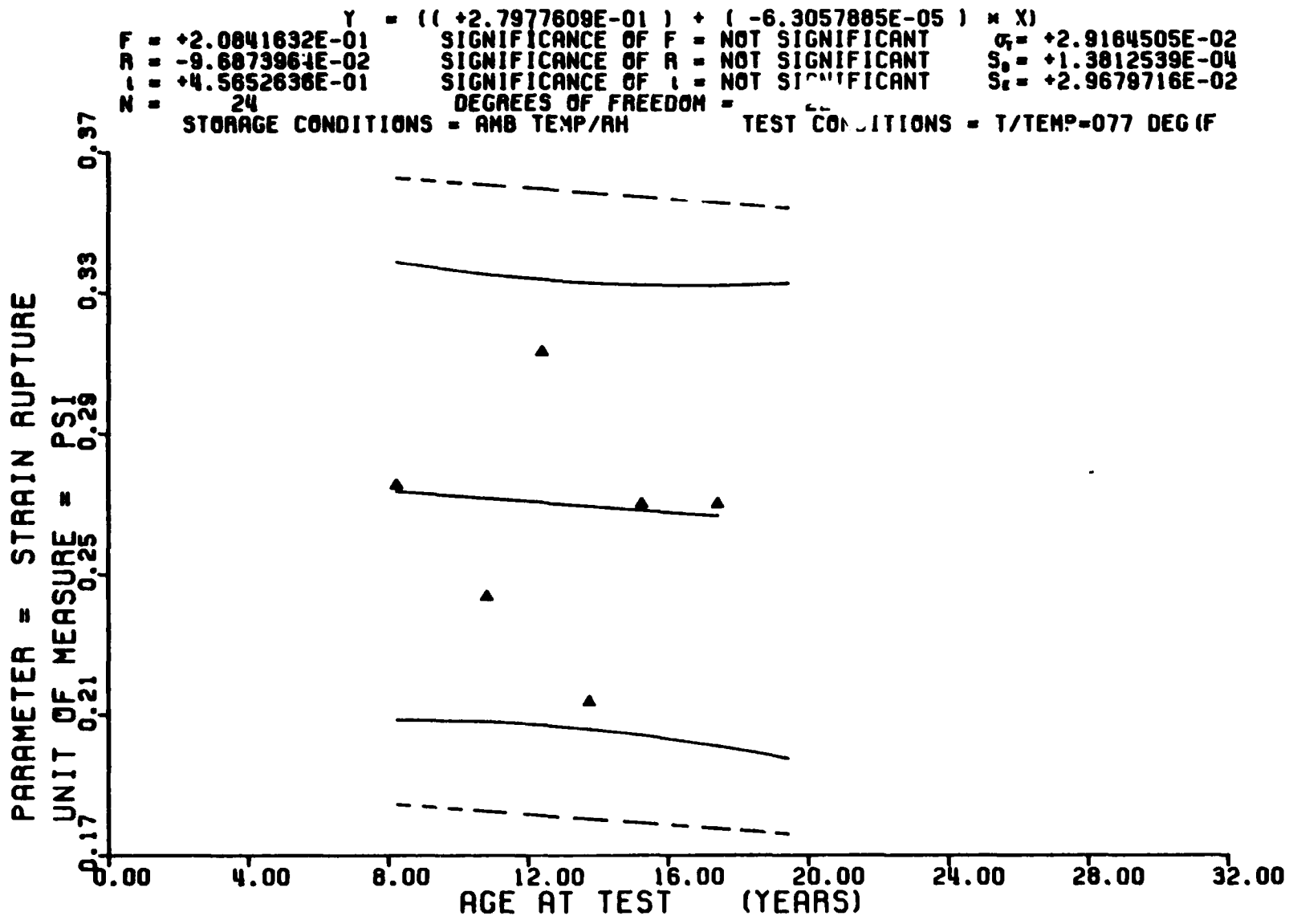

Y = ((+2.7977608E-01) + (-6.3057885E-05) * X)
F = +2.0841632E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +2.9164505E-02
R = -9.6873964E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +1.3812539E-04
t = +4.5652636E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +2.9679716E-02
N = 24 DEGREES OF FREEDOM =
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG(F
PARAMETER = STRAIN RUPTURE
UNIT OF MEASURE = PSI
0.37
0.33
0.29
0.25
0.21
0.17
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR,2.0IN G.L,BI-PROP,CHS=.0002,T/TEMP=077DEG(F),STN RUP<0022788>

Figure 118

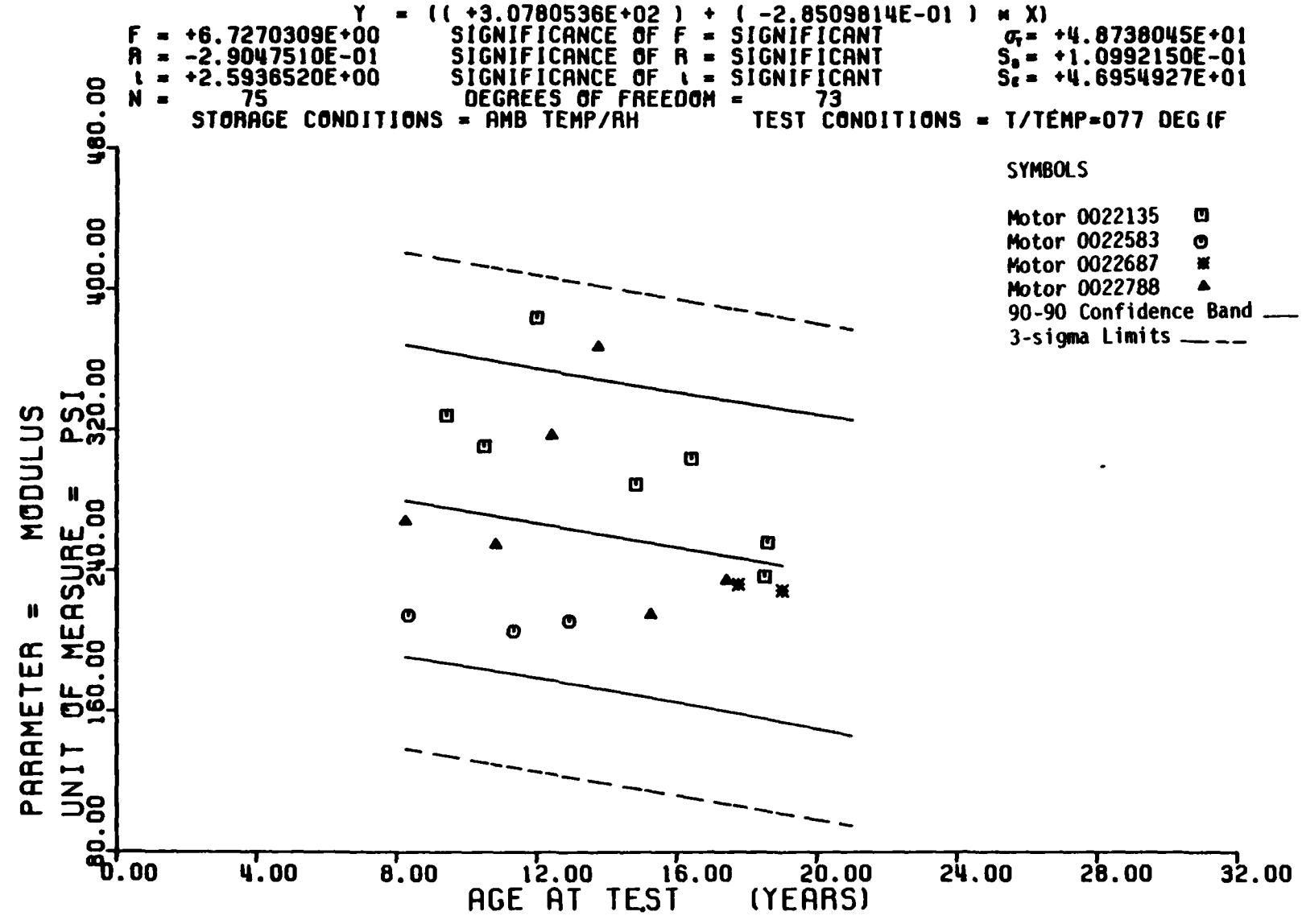

Y = ((+3.0780536E+02) + (-2.8509814E-01) * X)
F = +6.7270309E+00 SIGNIFICANCE OF F = SIGNIFICANT σT = +4.8738045E+01
R = -2.9047510E-01 SIGNIFICANCE OF R = SIGNIFICANT Sa = +1.0992150E-01
t = +2.5936520E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +4.6954927E+01
N = 75 DEGREES OF FREEDOM = 73
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG(F
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
480.00
400.00
320.00
240.00
160.00
80.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR,2.0IN G.L,BI-PROP,CHS=.0002 IN/MIN,T/TEMP=077 DEG(F),MODULUS

Figure 119

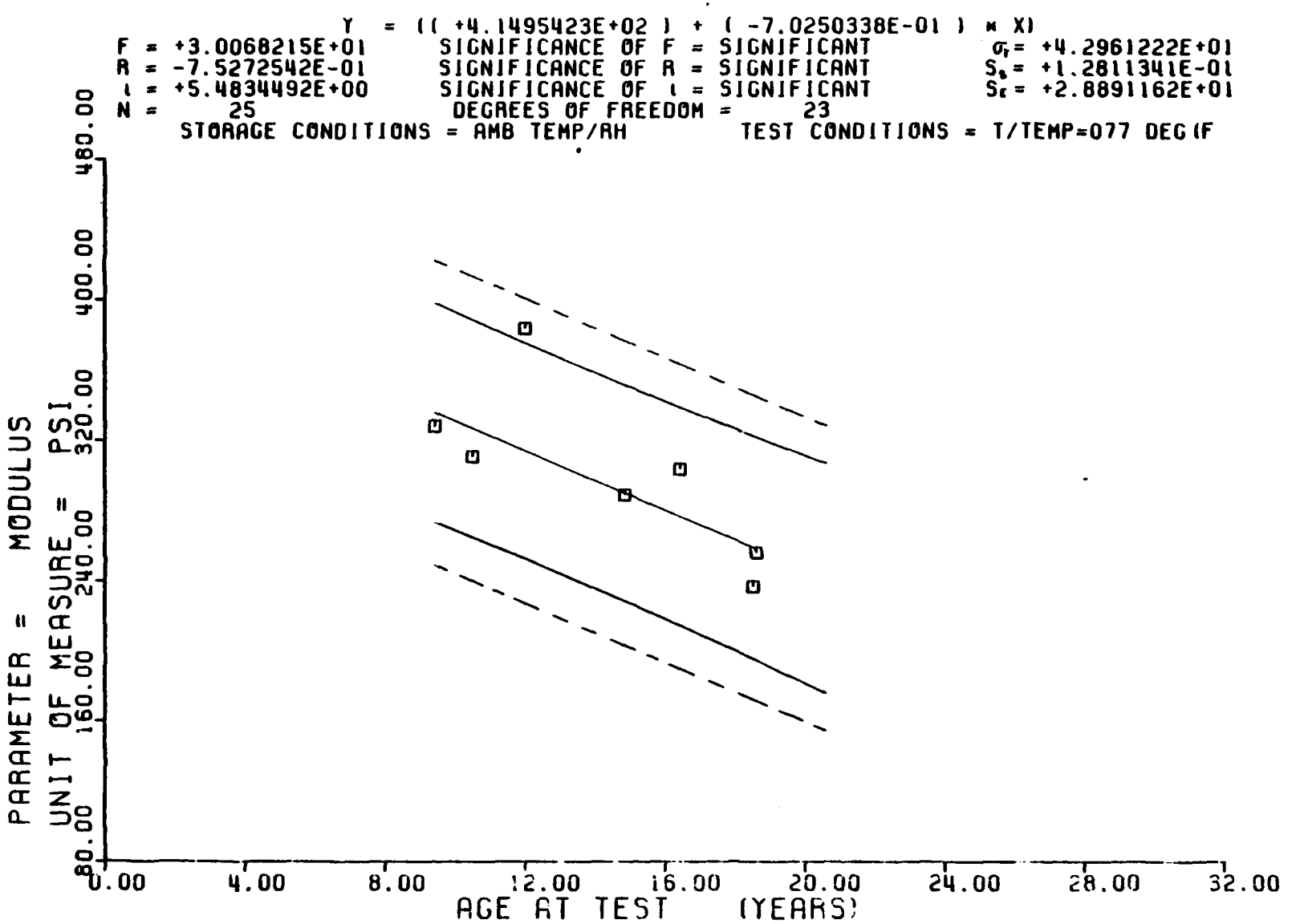

Y = ((+4.1495423E+02) + (-7.0250338E-01) * X)
F = +3.0068215E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = -7.5272542E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +5.4834492E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 25 DEGREES OF FREEDOM = 23
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG (F
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
480.00
400.00
320.00
240.00
160.00
80.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR,2.0IN G.L,BI-PROP,CHS=.0002,T/TEMP=077DEG(F),MODULUS 0022135

Figure 120

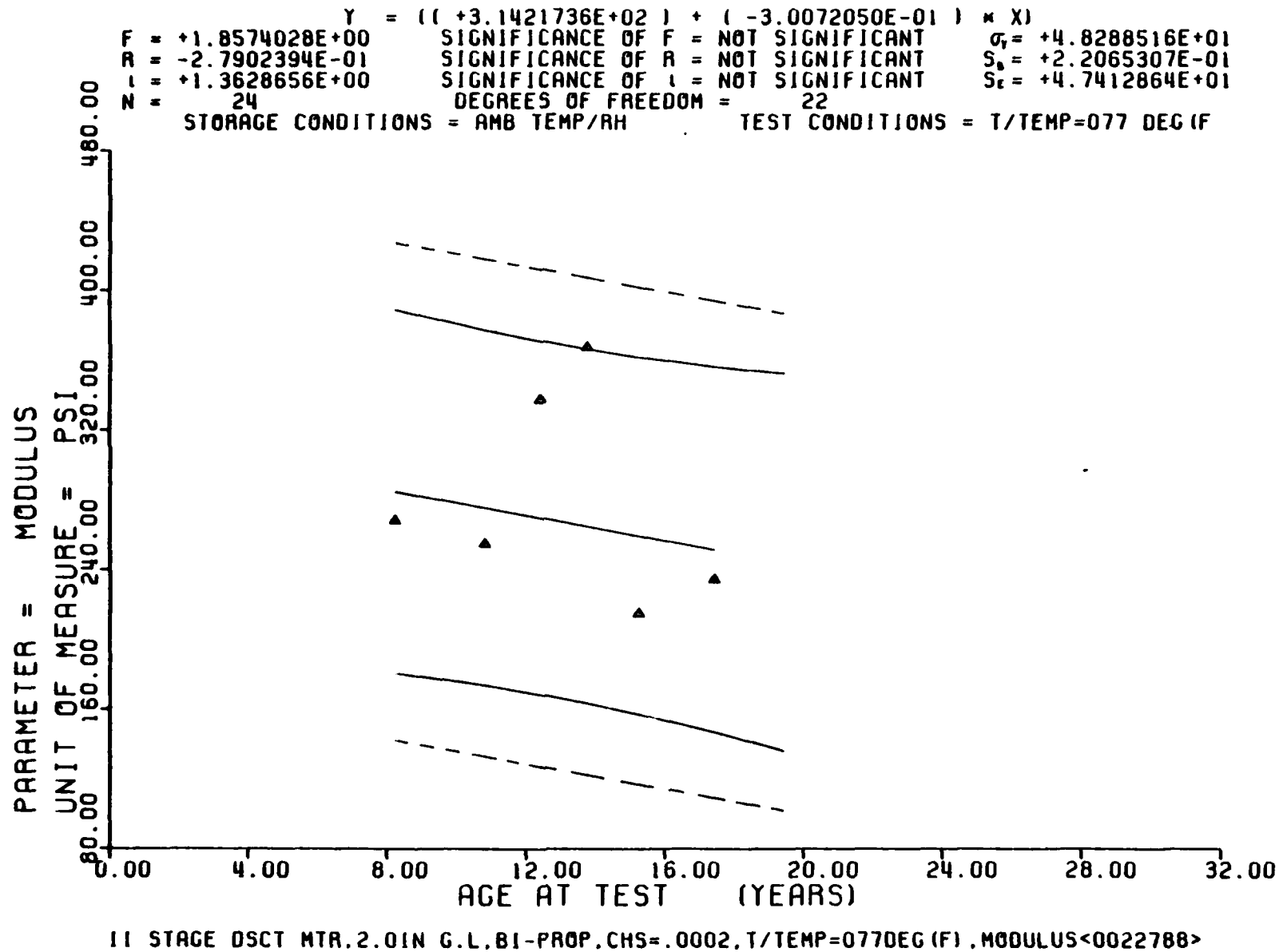
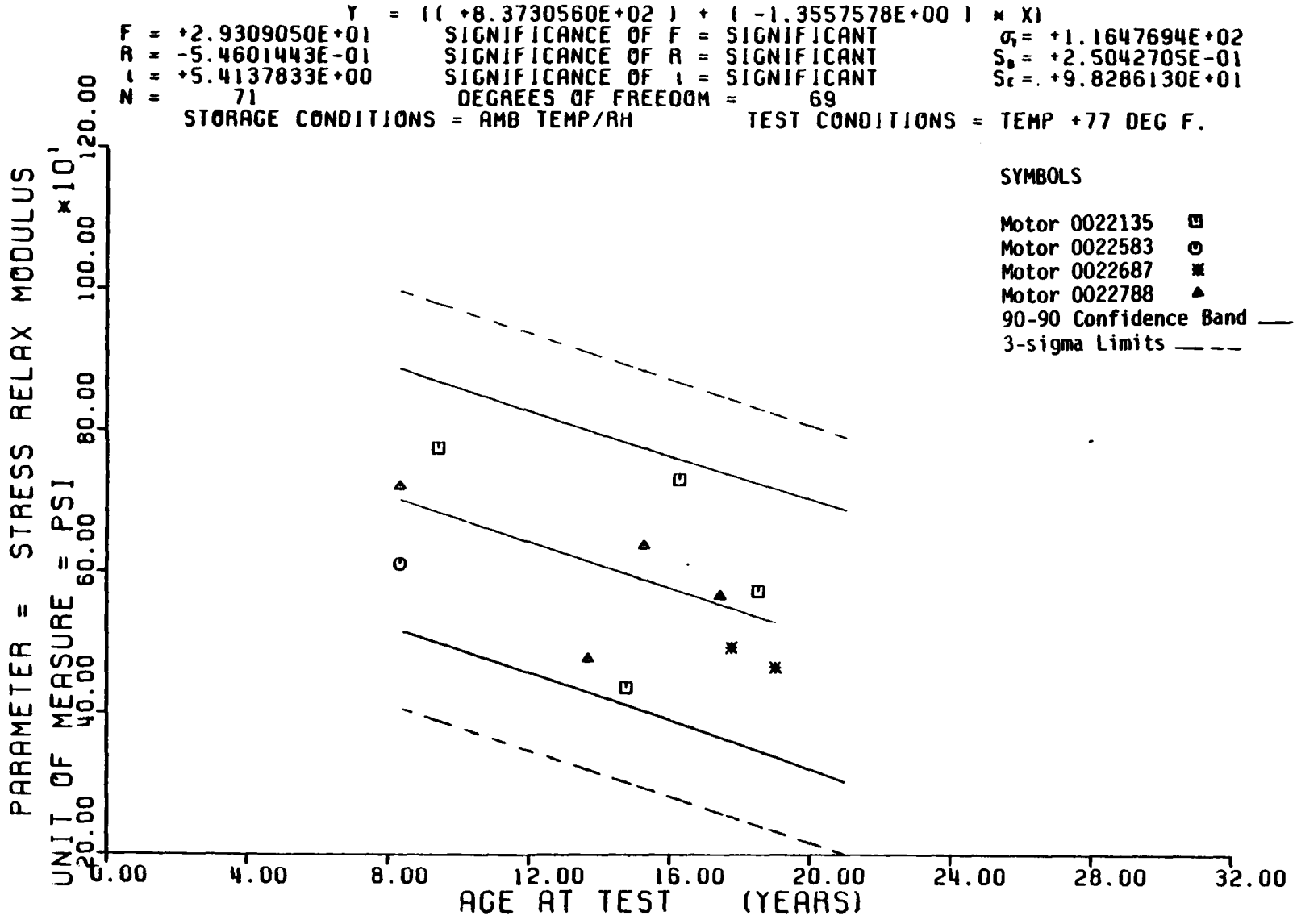
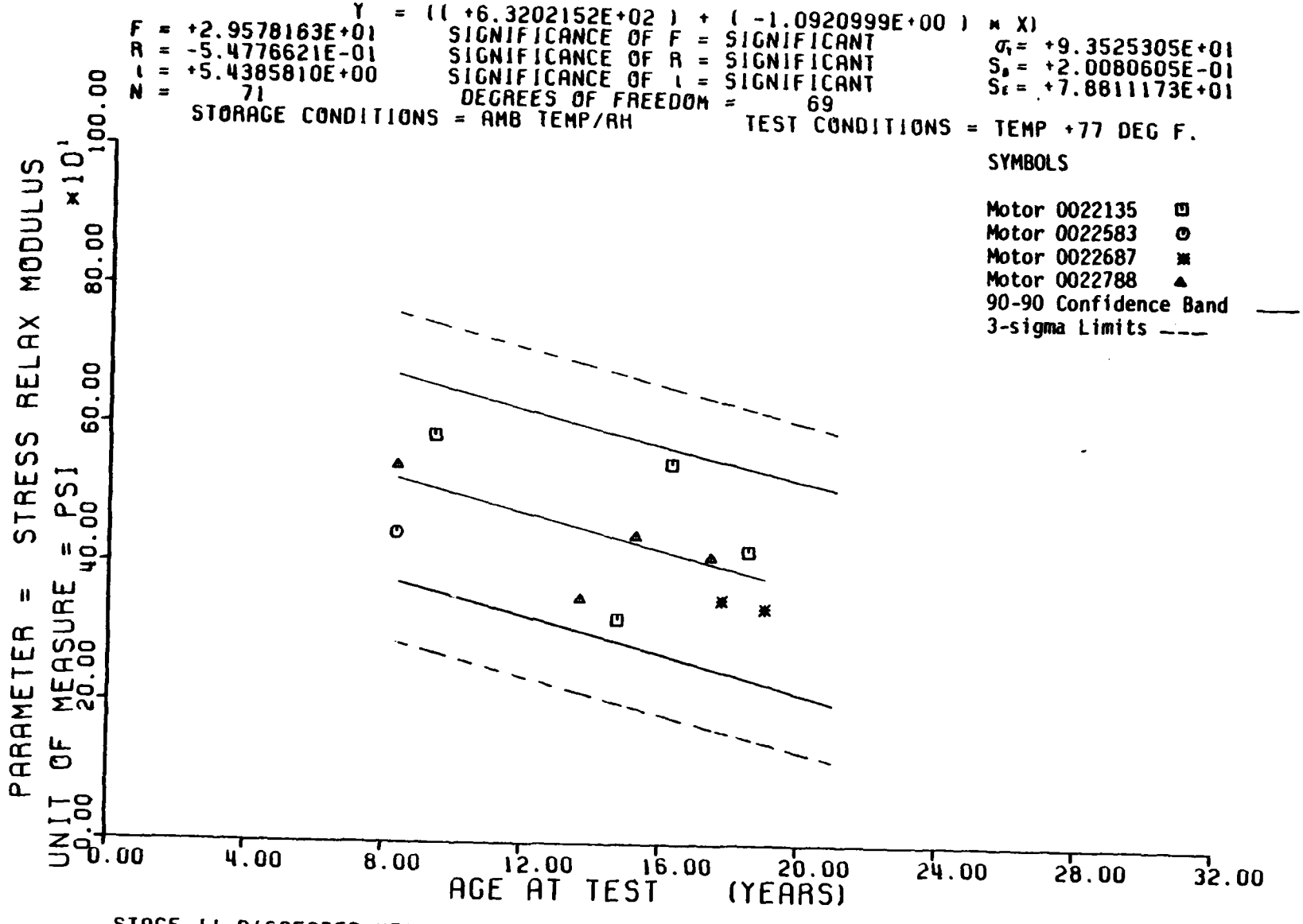

Y = ((+3.1421736E+02) + (-3.0072050E-01) * X)
F = +1.8574028E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +4.8288516E+01
R = -2.7902394E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +2.2065307E-01
t = +1.3628656E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +4.7412864E+01
N = 24 DEGREES OF FREEDOM = 22
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = T/TEMP=077 DEG(F
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
480.00
400.00
320.00
240.00
160.00
80.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTR.2.0IN G.L.BI-PROP.CHS=.0002,T/TEMP=077DEG(F),MODULUS<0022788>

Figure 121



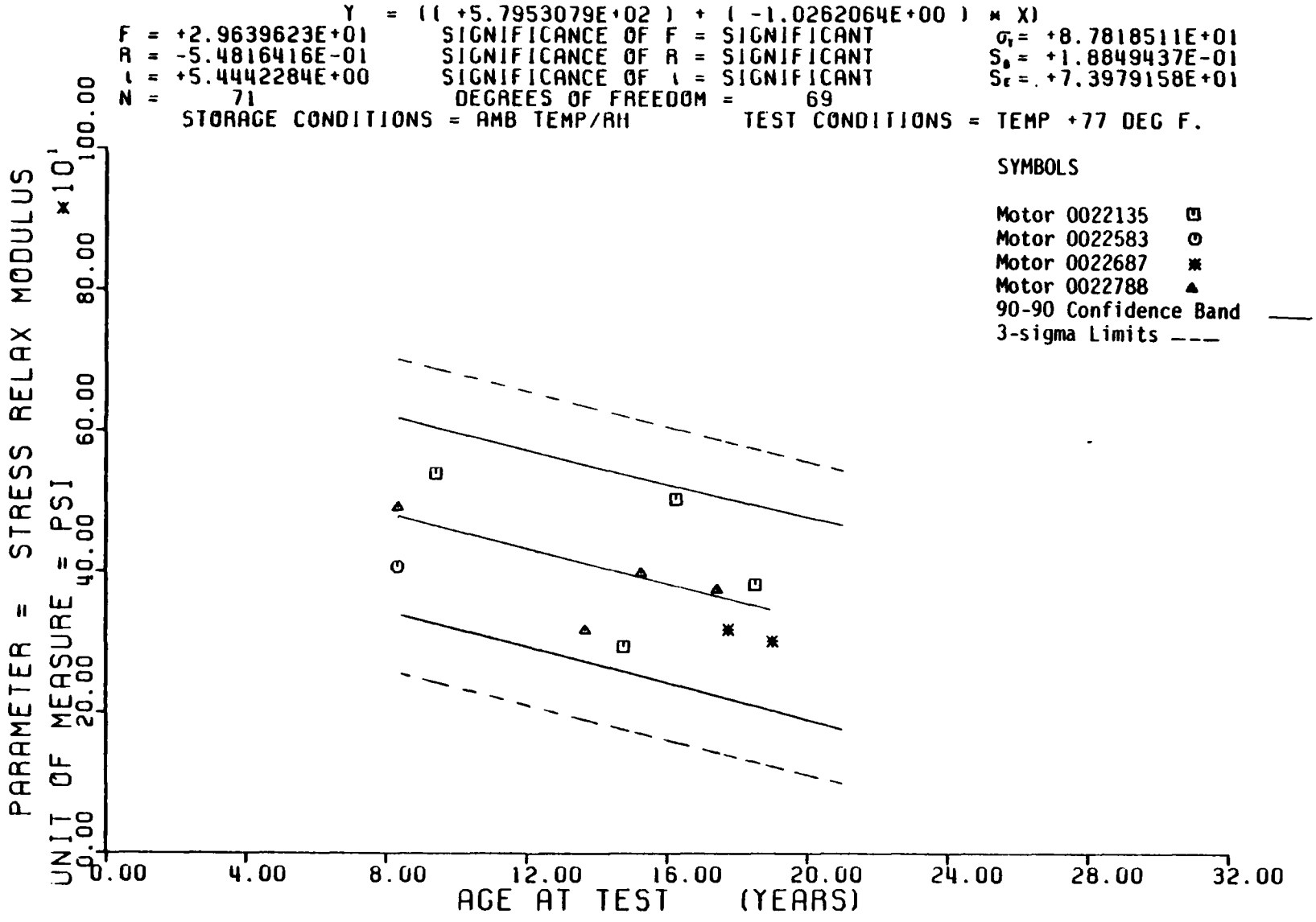
STAGE II,DISSECTED MTRS,OUTER,STRESS RELAXATION,3 PERCENT,+77 DEG,10/SEC.

Figure 122



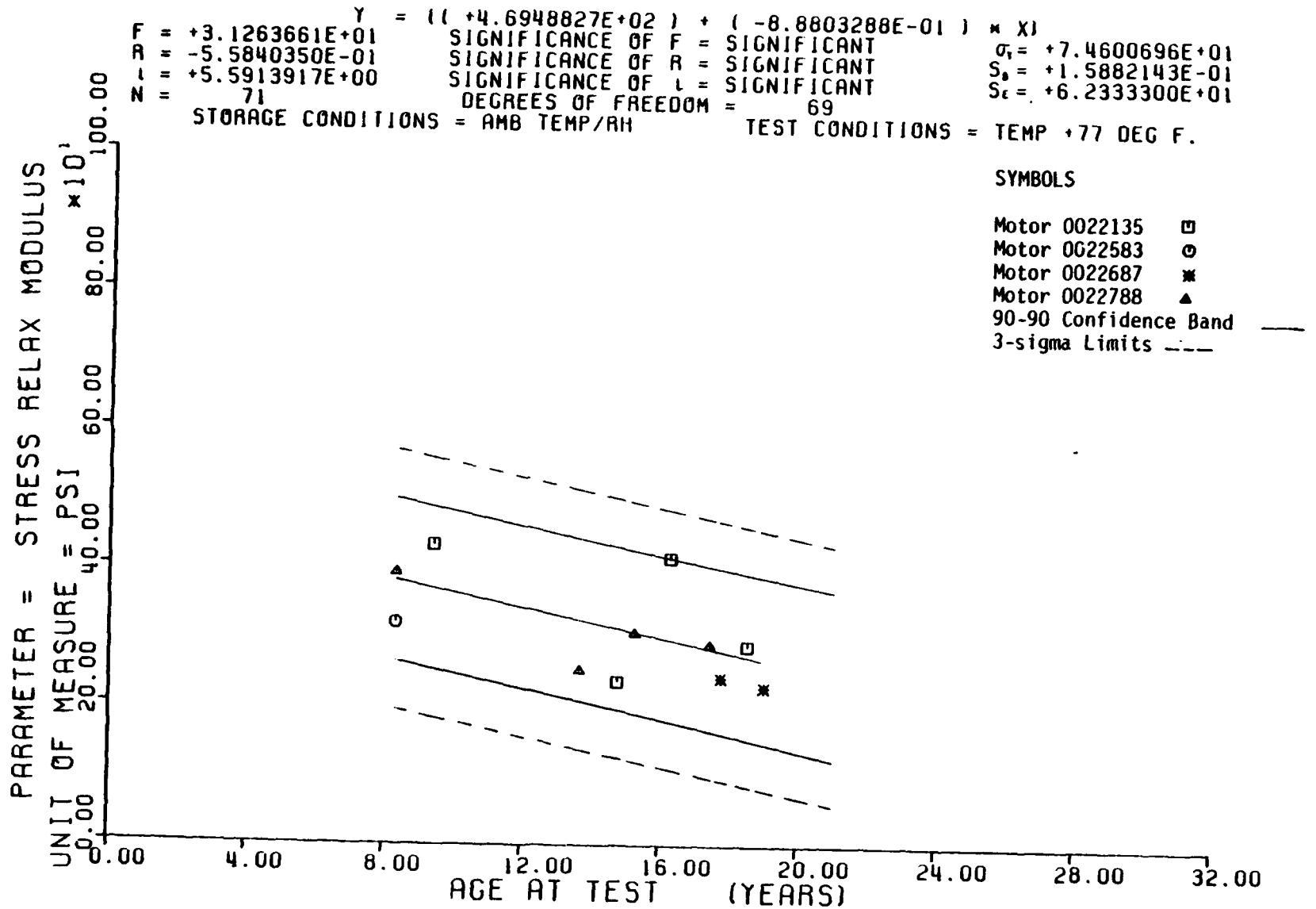
STAGE II,DISSECTED MTRS,OUTER,STRESS RELAXATION,3 PERCENT,+77 DEG,50/SEC.

Figure 123



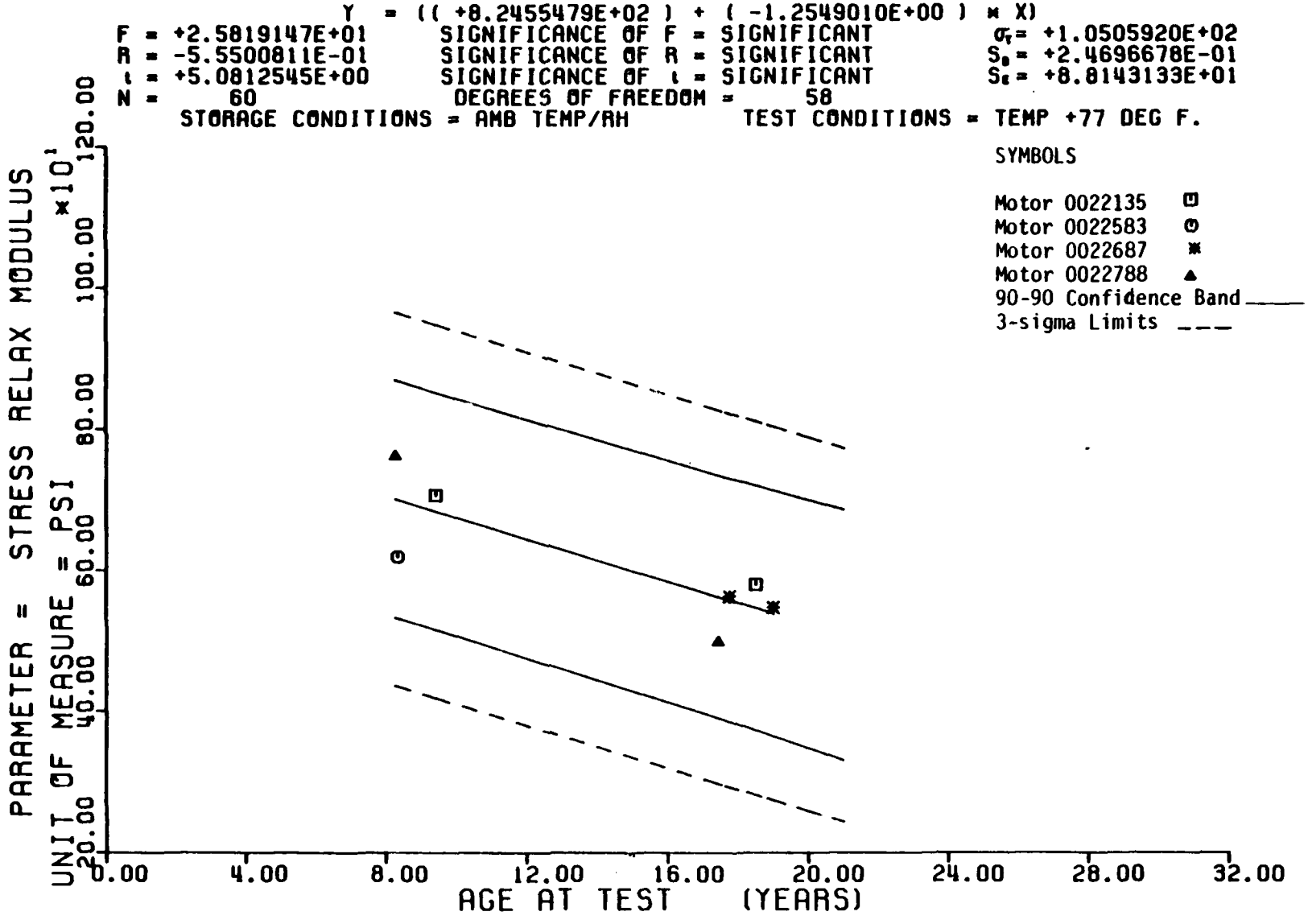
STAGE II,DISSECTED MTRS,OUTER,STRESS RELAXATION,3 PERCENT,+77 DEG,100/SEC.

Figure 124



STAGE II.DISSECTED MTRS.OUTER.STRESS RELAXATION.3 PERCENT.+77 DEG.1000/SEC.

Figure 125



STAGE II,DISSECTED MTRS,OUTER,STRESS RELAXATION,5 PERCENT,+77 DEG,10/SEC.

Figure 126

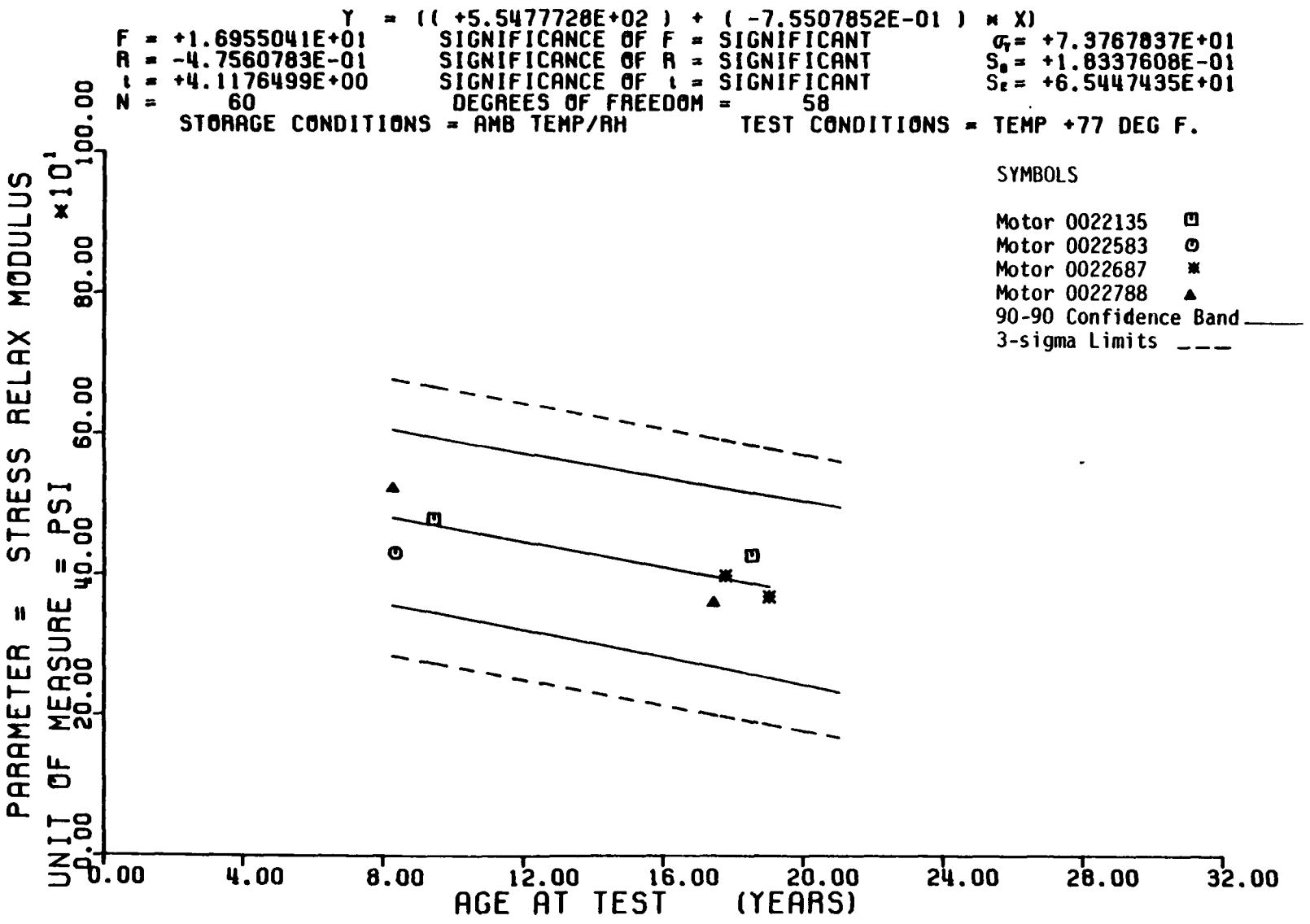
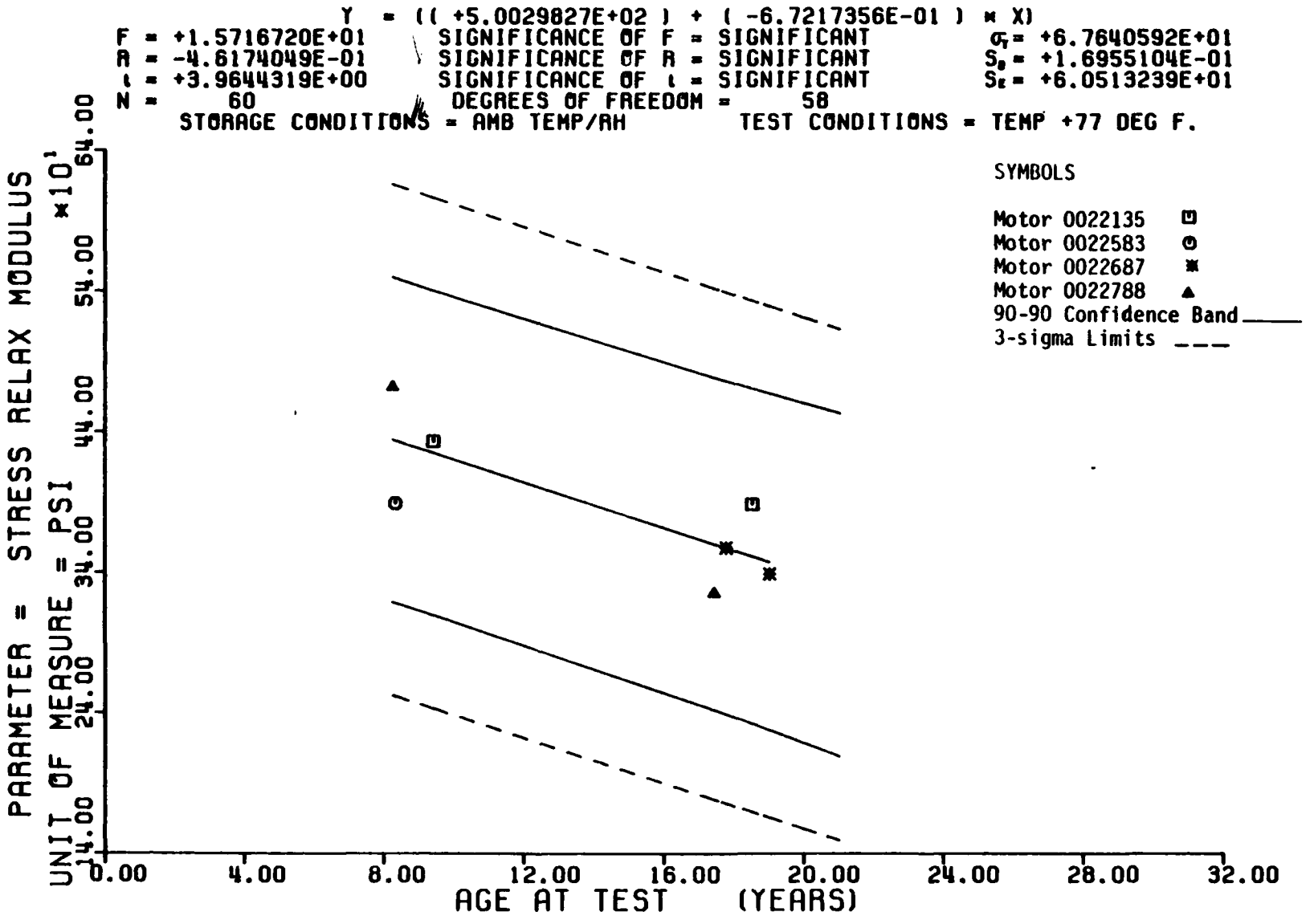

Y = ((+5.5477728E+02) + (-7.5507852E-01) * X)
F = +1.6955041E+01 SIGNIFICANCE OF F = SIGNIFICANT σY = +7.3767837E+01
R = -4.7560783E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.8337608E-01
t = +4.1176499E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +6.5447435E+01
N = 60 DEGREES OF FREEDOM = 58
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = TEMP +77 DEG F.
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI *10¹
0.00
20.00
40.00
60.00
80.00
100.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II,DISSECTED MTRS,OUTER,STRESS RELAXATION,5 PERCENT,+77 DEG,50/SEC.

Figure 127



STAGE II,DISSECTED MTRS,OUTER,STRESS RELAXATION,5 PERCENT,+77 DEG,100/SEC.

Figure 128

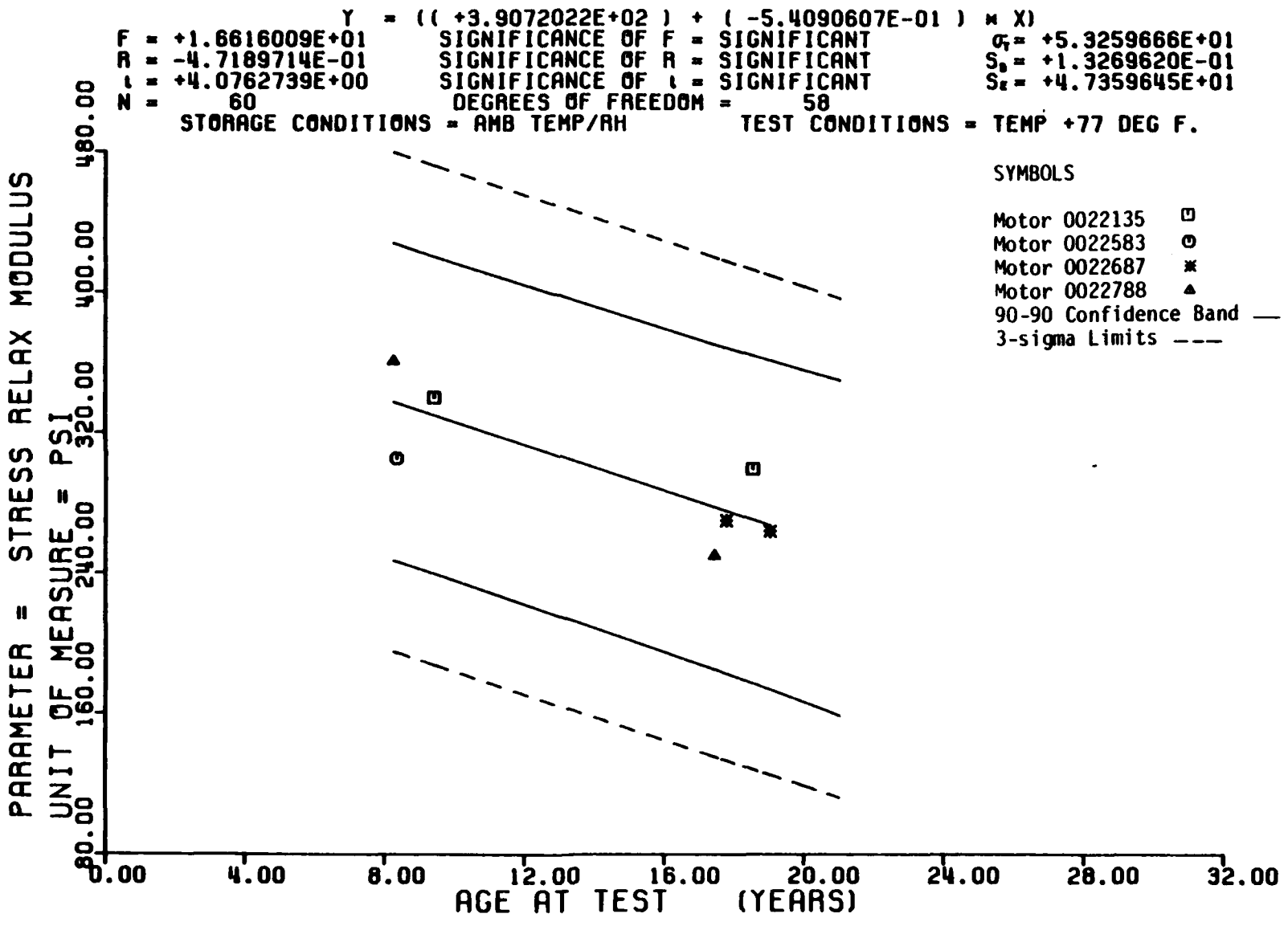

Y = ((+3.9072022E+02) + (-5.4090607E-01) * X)
F = +1.6616009E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = -4.7189714E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +4.0762739E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 60 DEGREES OF FREEDOM = 58
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = TEMP +77 DEG F.
σt = +5.3259666E+01
Sb = +1.3269620E-01
Sε = +4.7359645E+01
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI
80.00
160.00
240.00
320.00
400.00
480.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II,DISSECTED MTRS,OUTER,STRESS RELAXATION,5 PERCENT,+77 DEG,1000/SEC.

Figure 129

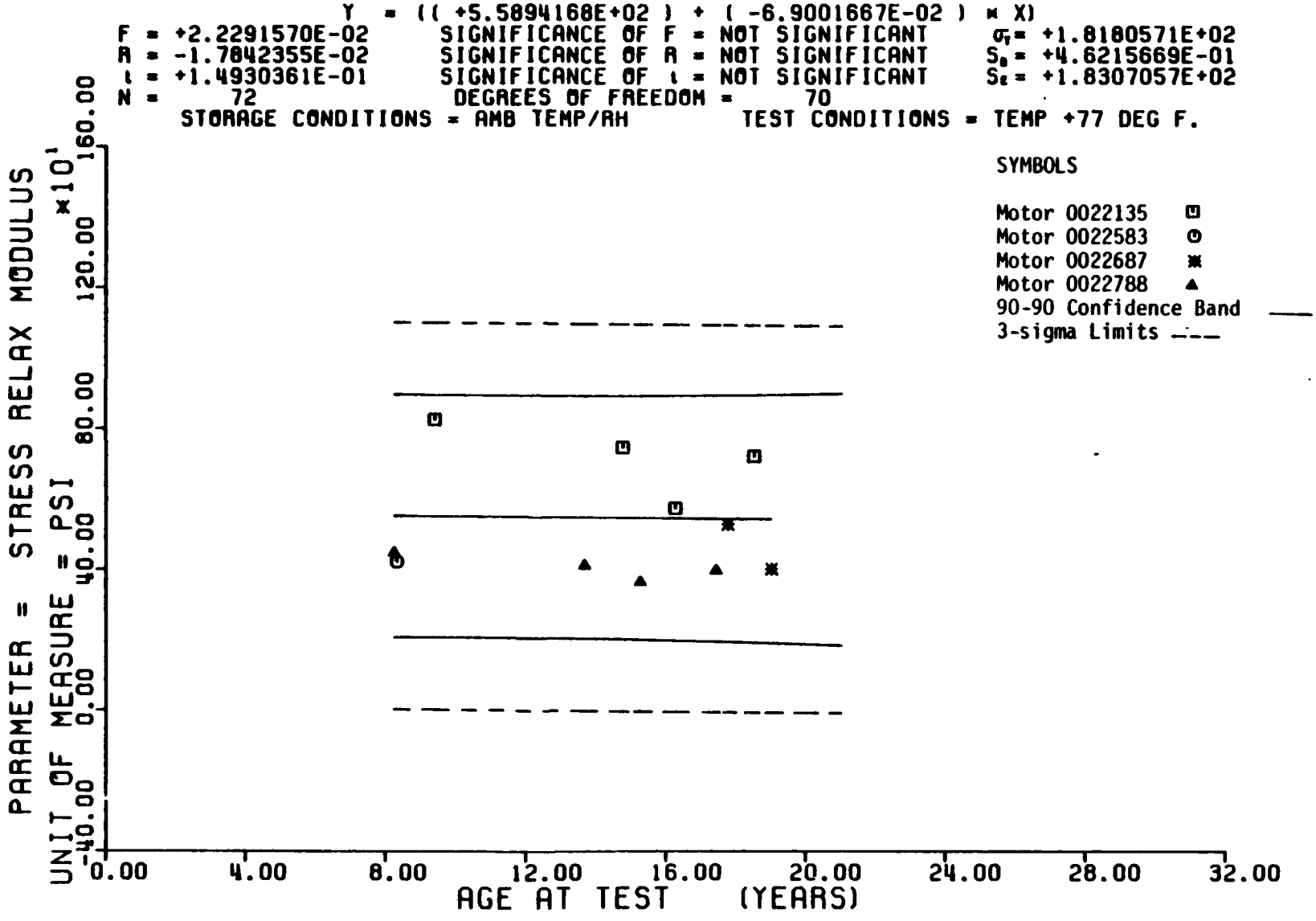
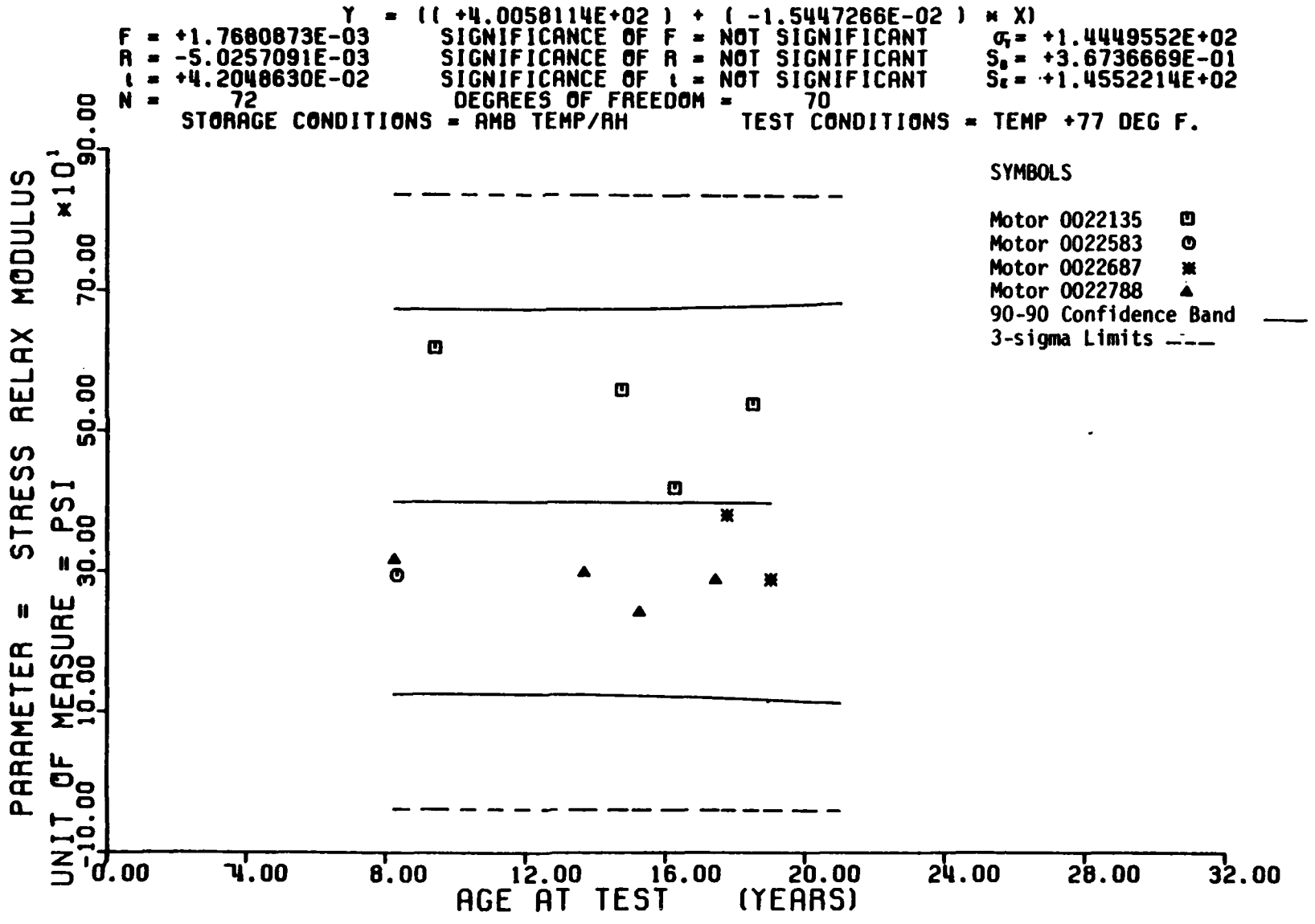
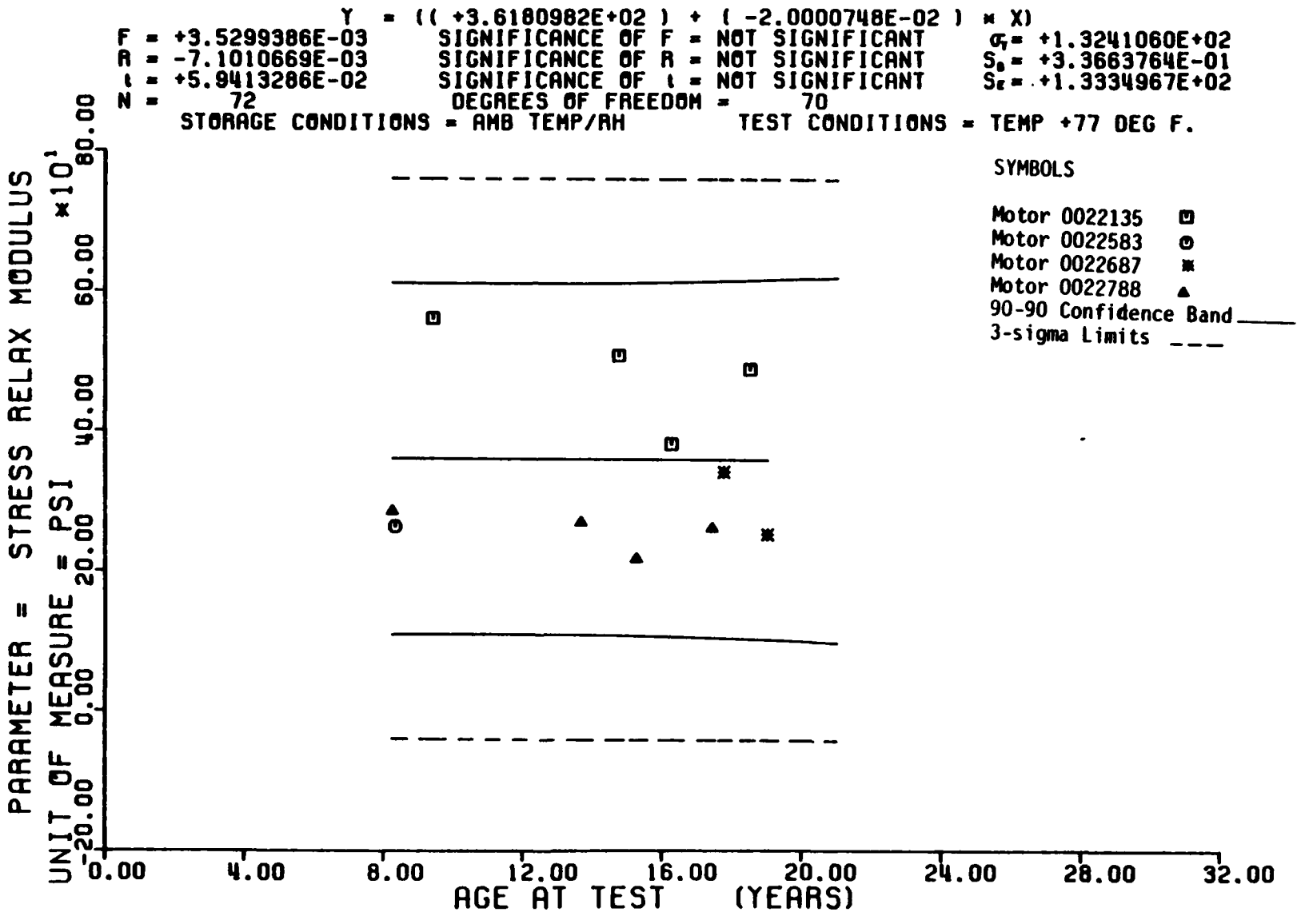

Y = ((+5.5894168E+02) + (-6.9001667E-02) * X)
F = +2.2291570E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT σt = +1.8180571E+02
R = -1.7842355E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Se = +1.8307057E+02
t = +1.4930361E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT
N = 72 DEGREES OF FREEDOM = 70
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = TEMP +77 DEG F.
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI
160.00
120.00
80.00
40.00
0.00
-40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II,DISSECTED MTRS,INNER,STRESS RELAXATION,3 PERCENT,+77 DEG,10/SEC.

Figure 130



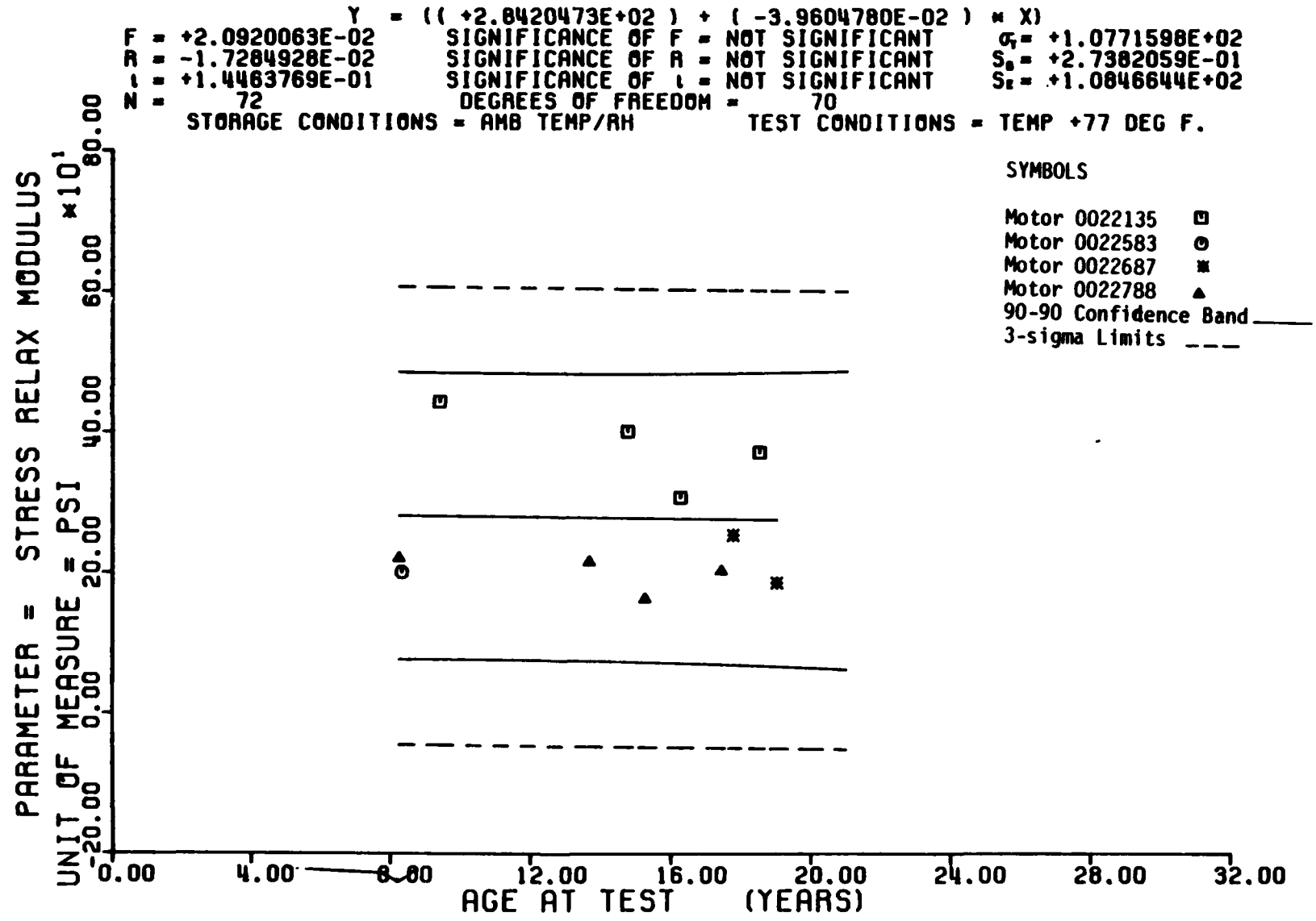
STAGE II,DISSECTED MTRS,INNER,STRESS RELAXATION,3 PERCENT,+77 DEG,50/SEC.

Figure 131



STAGE II,DISSECTED MTRS,INNER,STRESS RELAXATION,3 PERCENT,+77 DEG,100/SEC.

Figure 132



STAGE II,DISSECTED MTRS,INNER,STRESS RELAXATION,3 PERCENT,+77 DEG,1000/SEC.

Figure 133

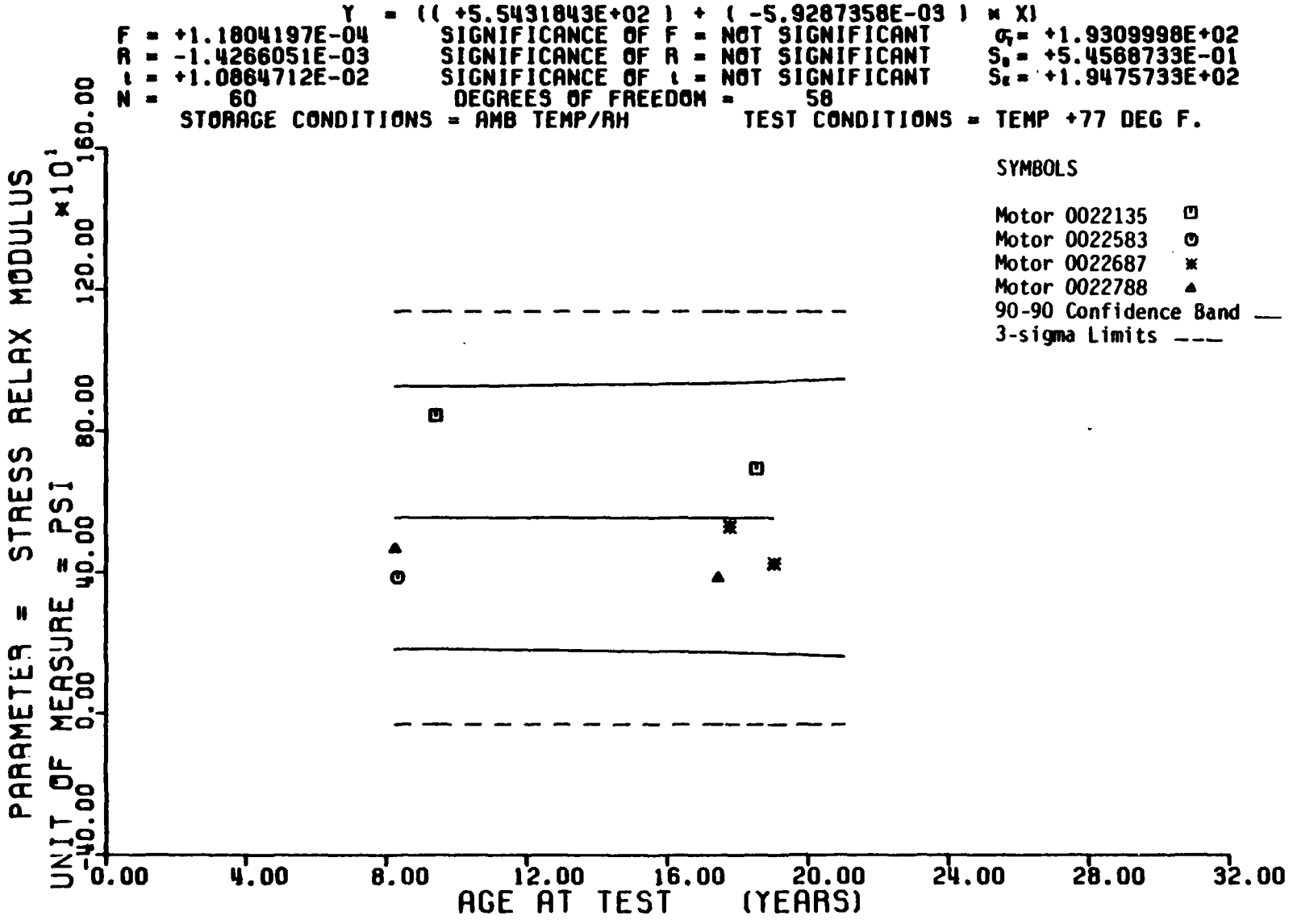
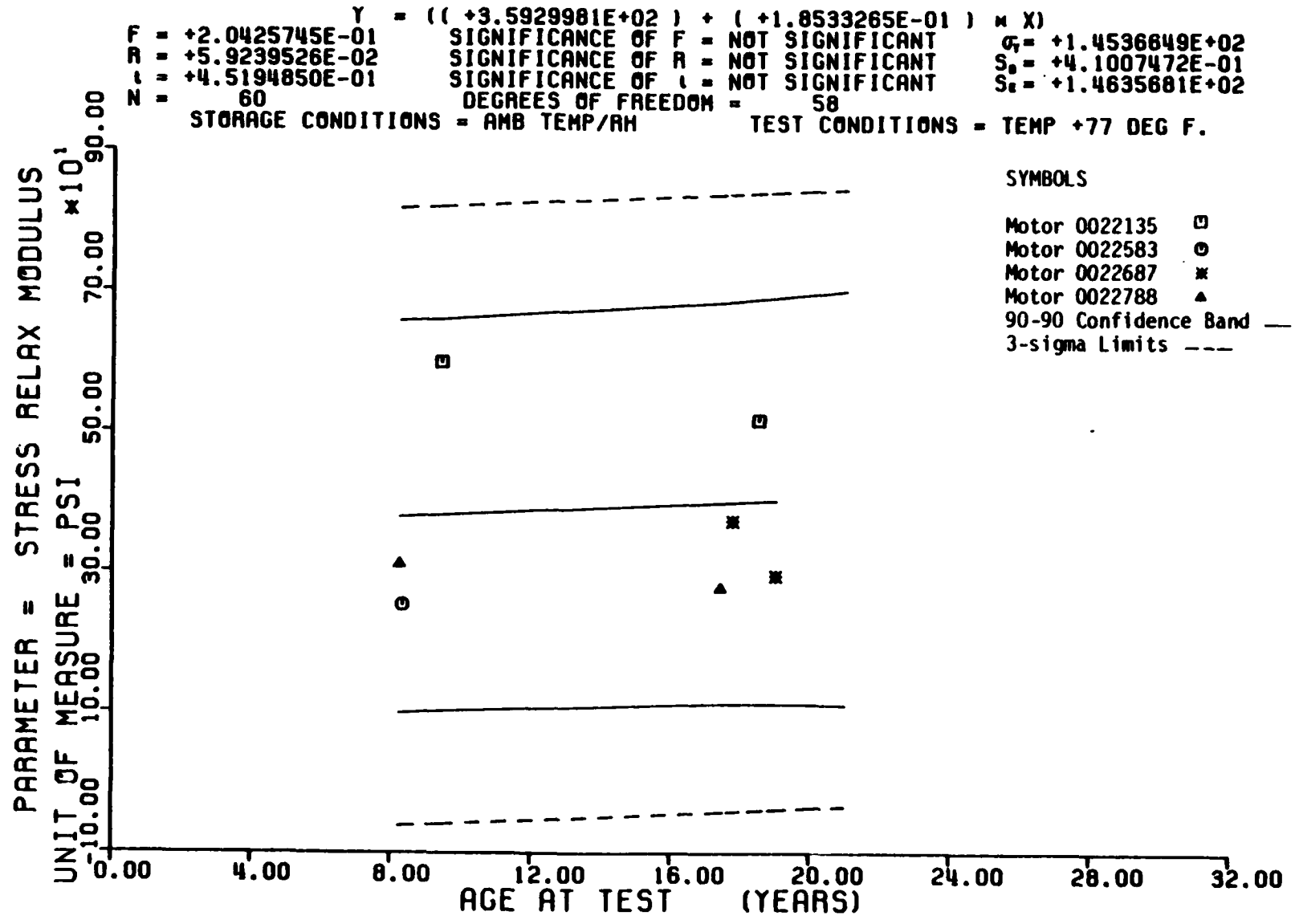
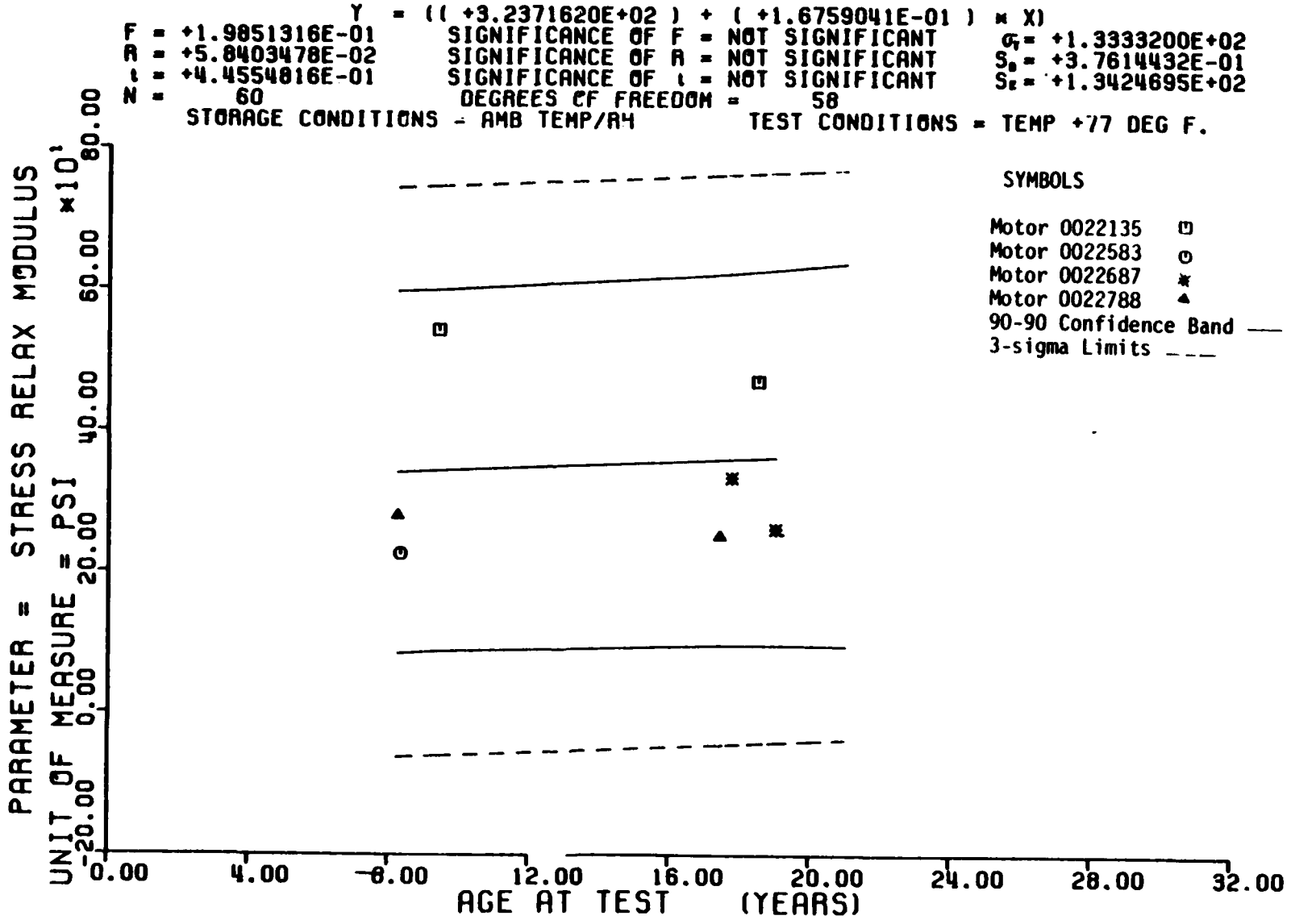

Y = ((+5.5431843E+02) + (-5.9287358E-03) * X)
F = +1.1804197E-04 SIGNIFICANCE OF F = NOT SIGNIFICANT σ1 = +1.9309998E+02
R = -1.4266051E-03 SIGNIFICANCE OF R = NOT SIGNIFICANT Se = +5.4568733E-01
t = +1.0864712E-02 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +1.9475733E+02
N = 60 DEGREES OF FREEDOM = 58
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = TEMP +77 DEG F.
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI *10¹
160.00
120.00
80.00
40.00
0.00
-40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II,DISSECTED MTRS,INNER,STRESS RELAXATION,5 PERCENT,+77 DEG,10/SEC.

Figure 134



STAGE II,DISSECTED MTRS,INNER,STRESS RELAXATION,5 PERCENT,+77 DEG,50/SEC.

Figure 135



STAGE II, DISSECTED MTRS, INNER, STRESS RELAXATION, 5 PERCENT, +77 DEG, 100/SEC.

Figure 12

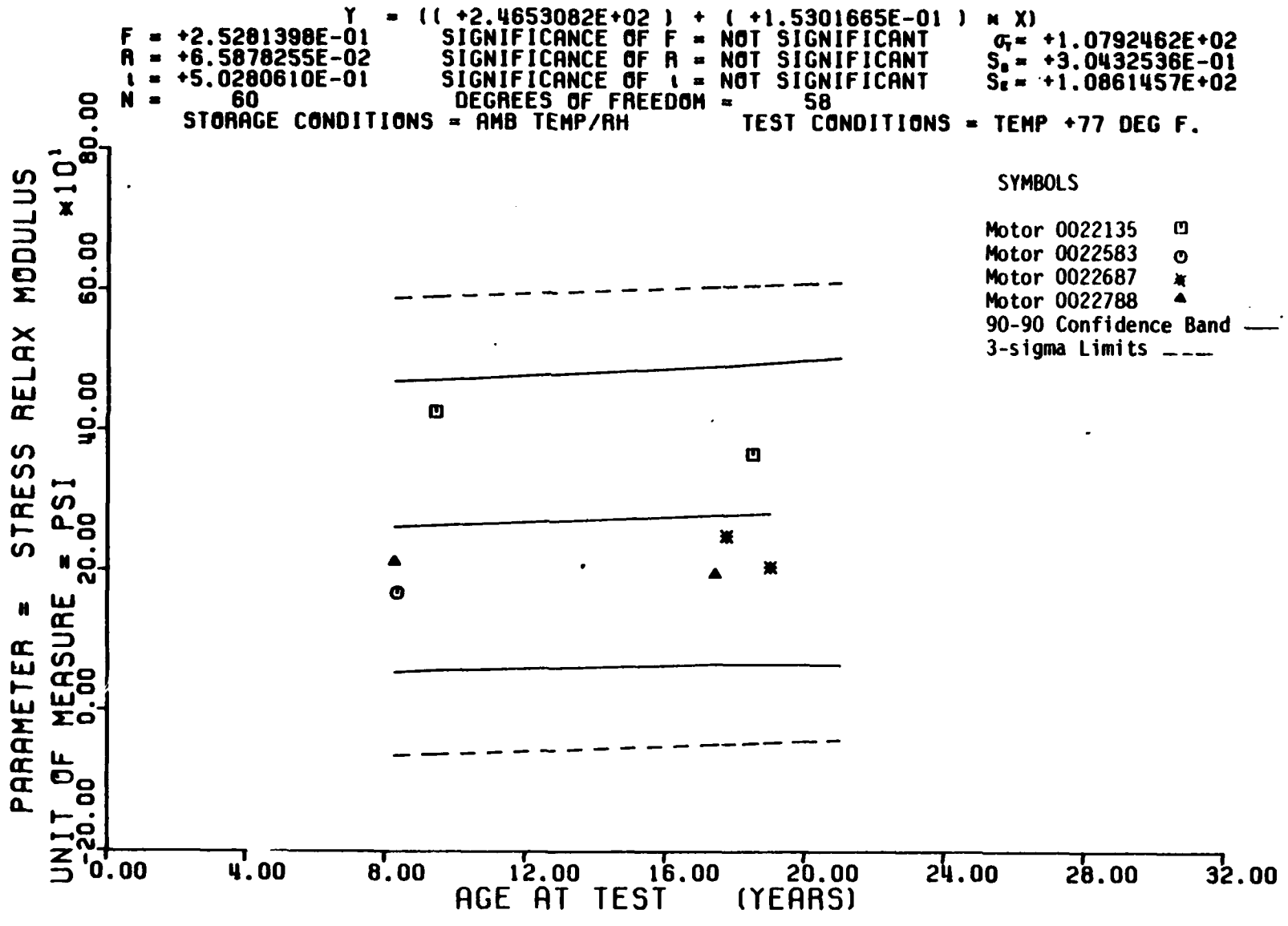
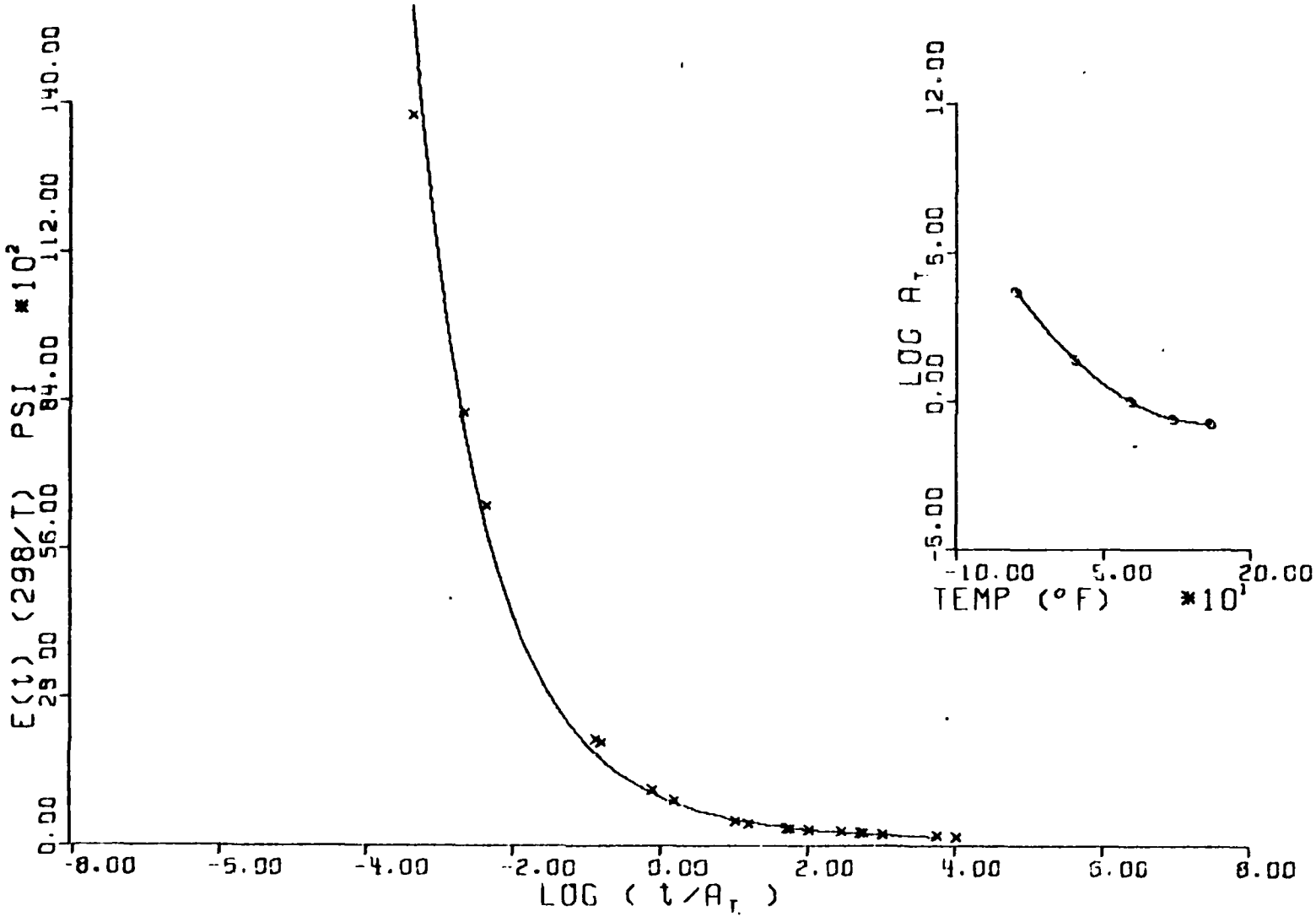
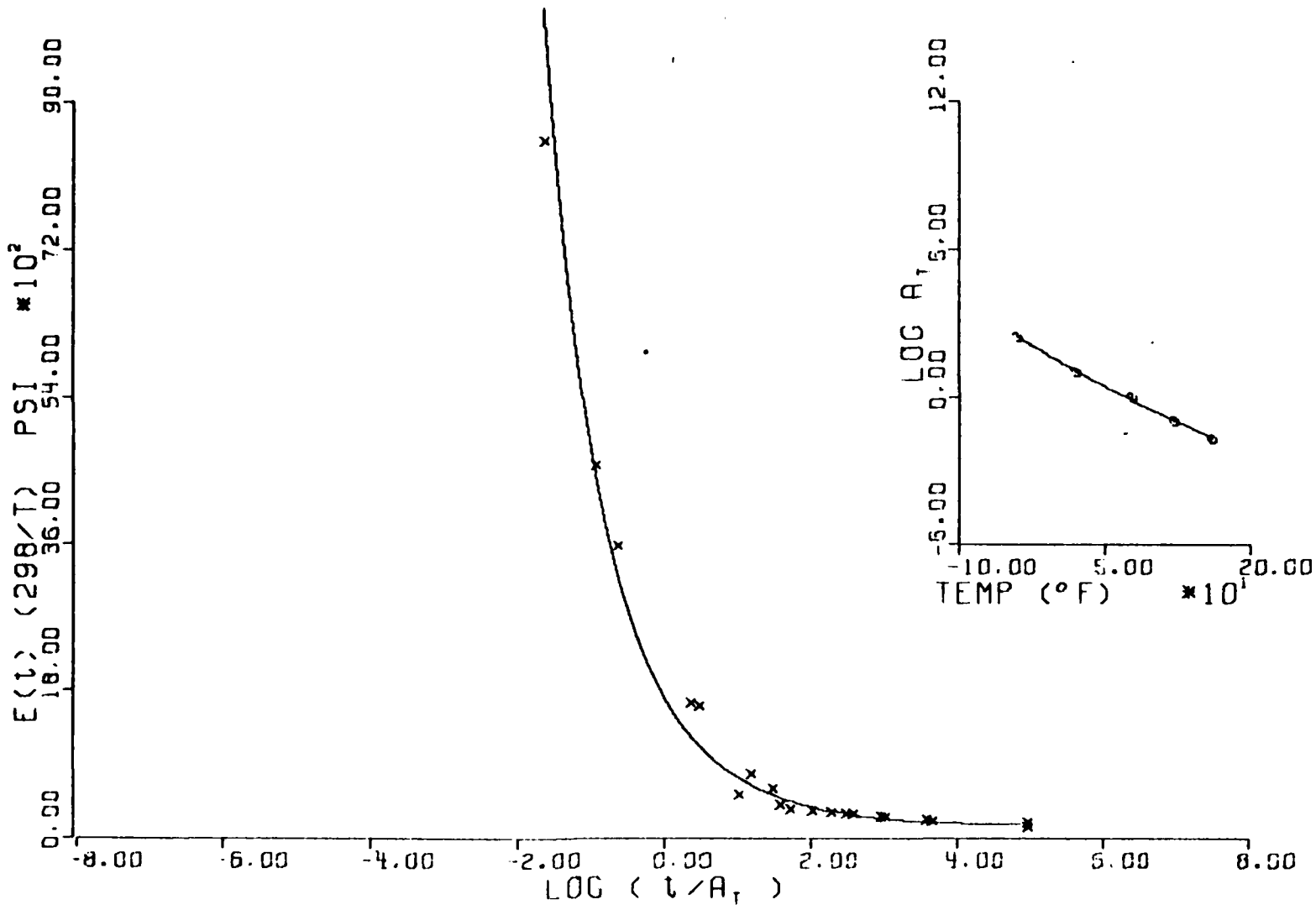

Y = ((+2.4653082E+02) + (+1.5301665E-01) * X)
F = +2.5281398E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σ = +1.0792462E+02
R = +6.5878255E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT S = +3.0432536E-01
t = +5.0280610E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT S = +1.0861457E+02
N = 60 DEGREES OF FREEDOM = 58
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = TEMP +77 DEG F.
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI x10¹
80.00
60.00
40.00
20.00
0.00
-20.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II,DISSECTED MTRS,INNER,STRESS RELAXATION,5 PERCENT,+77 DEG,1000/SEC.

Figure 137



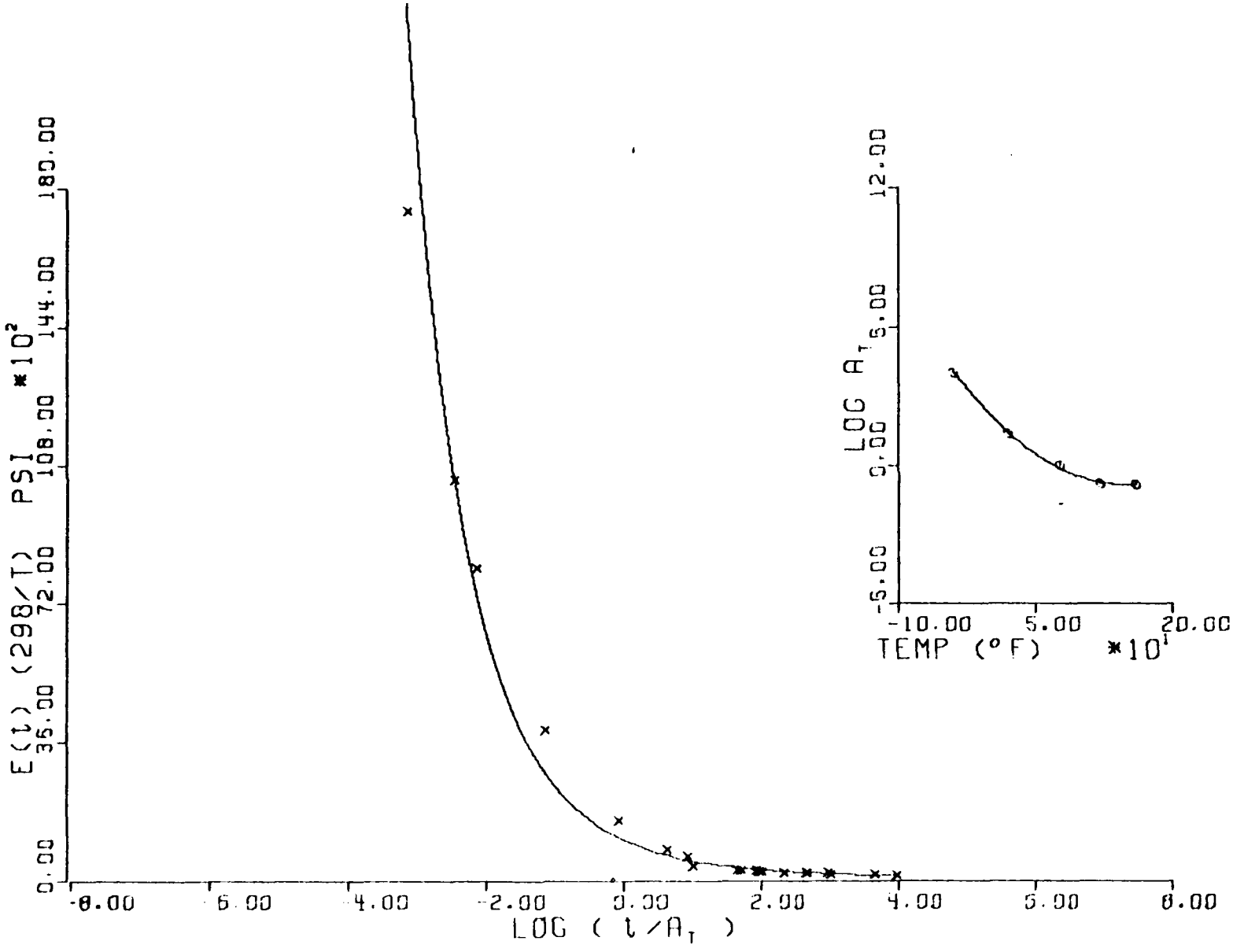
ANP 2862 (OUTER) PROPELLANT, MOTOR 0022687 AT 3% STRAIN, TESTED IN 1983

Figure 138



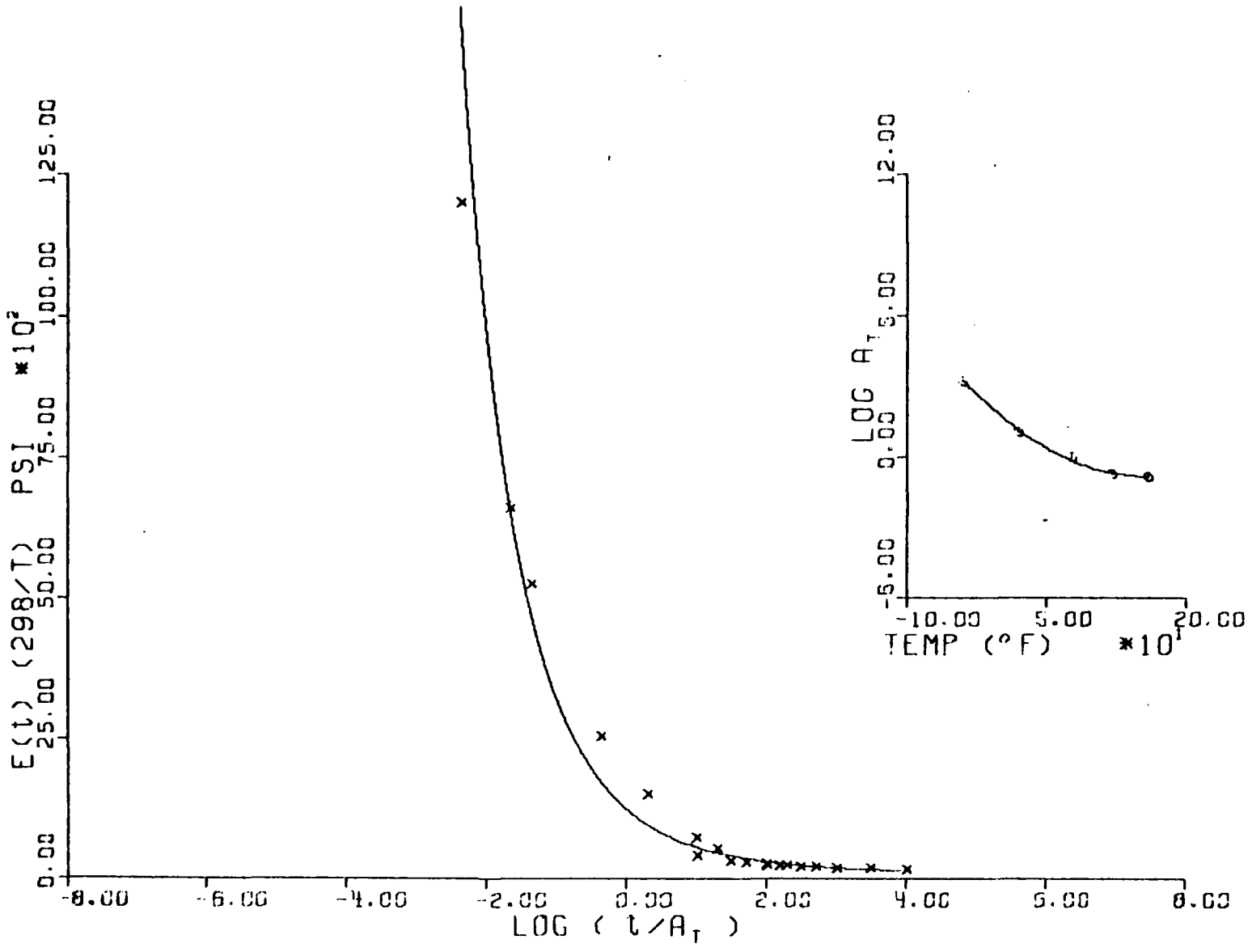
ANP 2862 (OUTER) PROPELLANT, MOTOR 0022687 AT 5% STRAIN, TESTED IN 1983

Figure 139



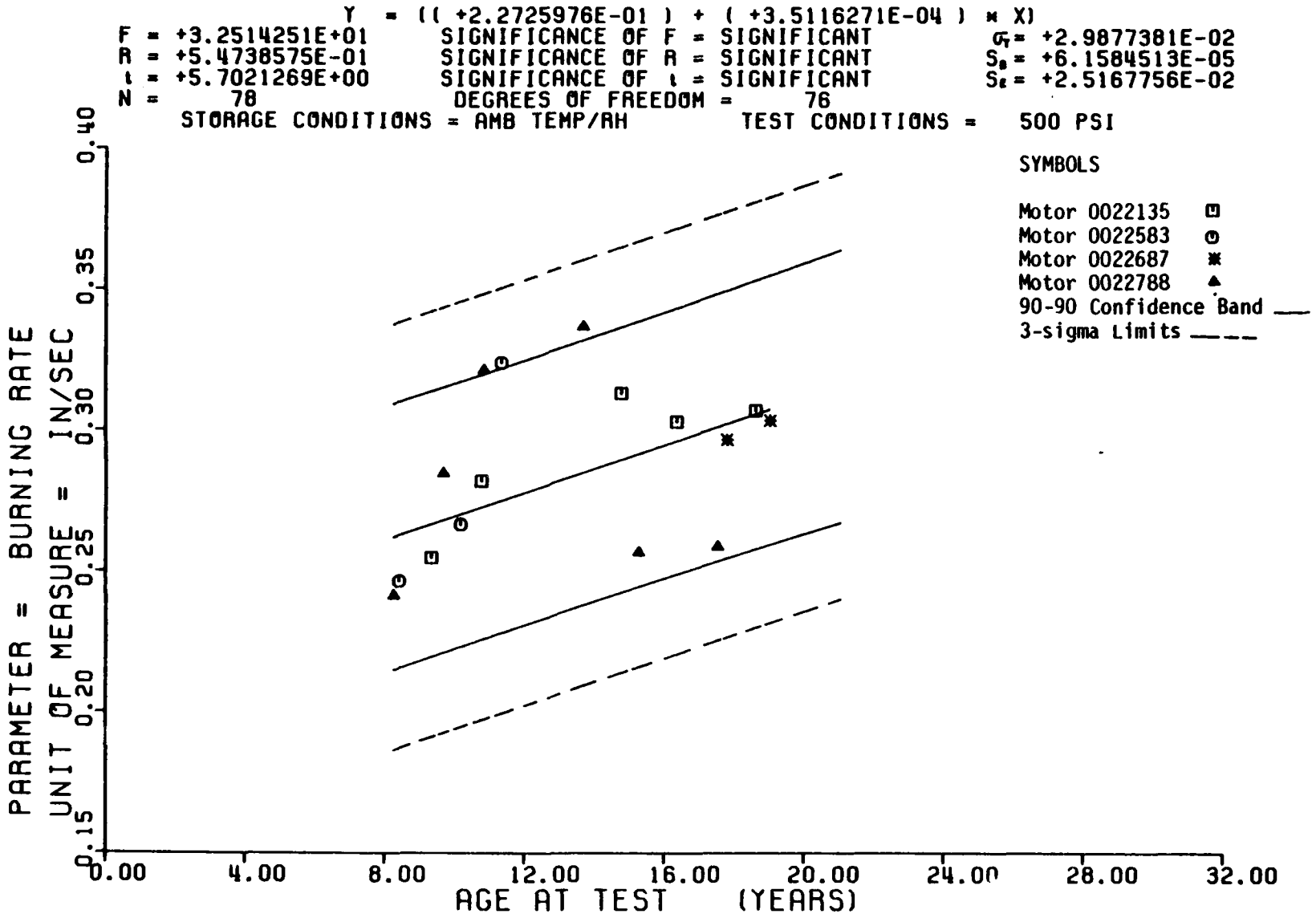
ANP 2864 (INNER) PROPELLANT, MOTOR 0022687 AT 3% STRAIN, TESTED IN 1983

Figure 140



ANP-2864 (INNER) PROPELLANT, MOTOR 0022687 AT 5% STRAIN, TESTED IN 1983

Figure 141



STAGE II DISSECTED MTRS, OUTER, BURNING RATE AT 500 PSI

Figure 142

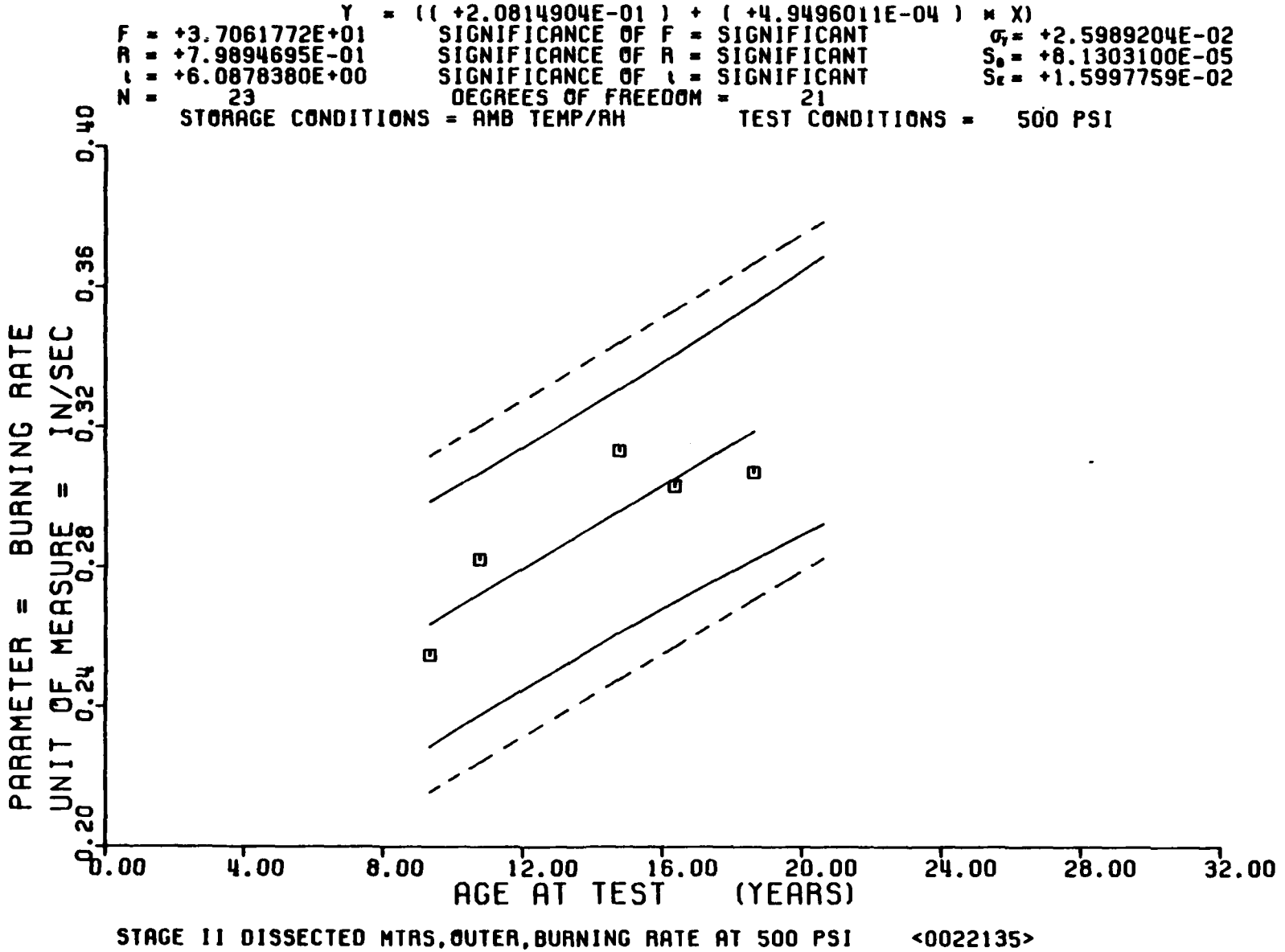

Y = ((+2.0814904E-01) + (+4.9496011E-04) * X)
F = +3.7061772E+01 SIGNIFICANCE OF F = SIGNIFICANT σ_Y = +2.5989204E-02
R = +7.9894695E-01 SIGNIFICANCE OF R = SIGNIFICANT S_B = +8.1303100E-05
t = +6.0878380E+00 SIGNIFICANCE OF t = SIGNIFICANT S_E = +1.5997759E-02
N = 23 DEGREES OF FREEDOM = 21
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 500 PSI
PARAMETER = BURNING RATE
UNIT OF MEASURE = IN/SEC
0.20
0.24
0.28
0.32
0.36
0.40
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSECTED MTRS,OUTER,BURNING RATE AT 500 PSI <0022135>

Figure 143

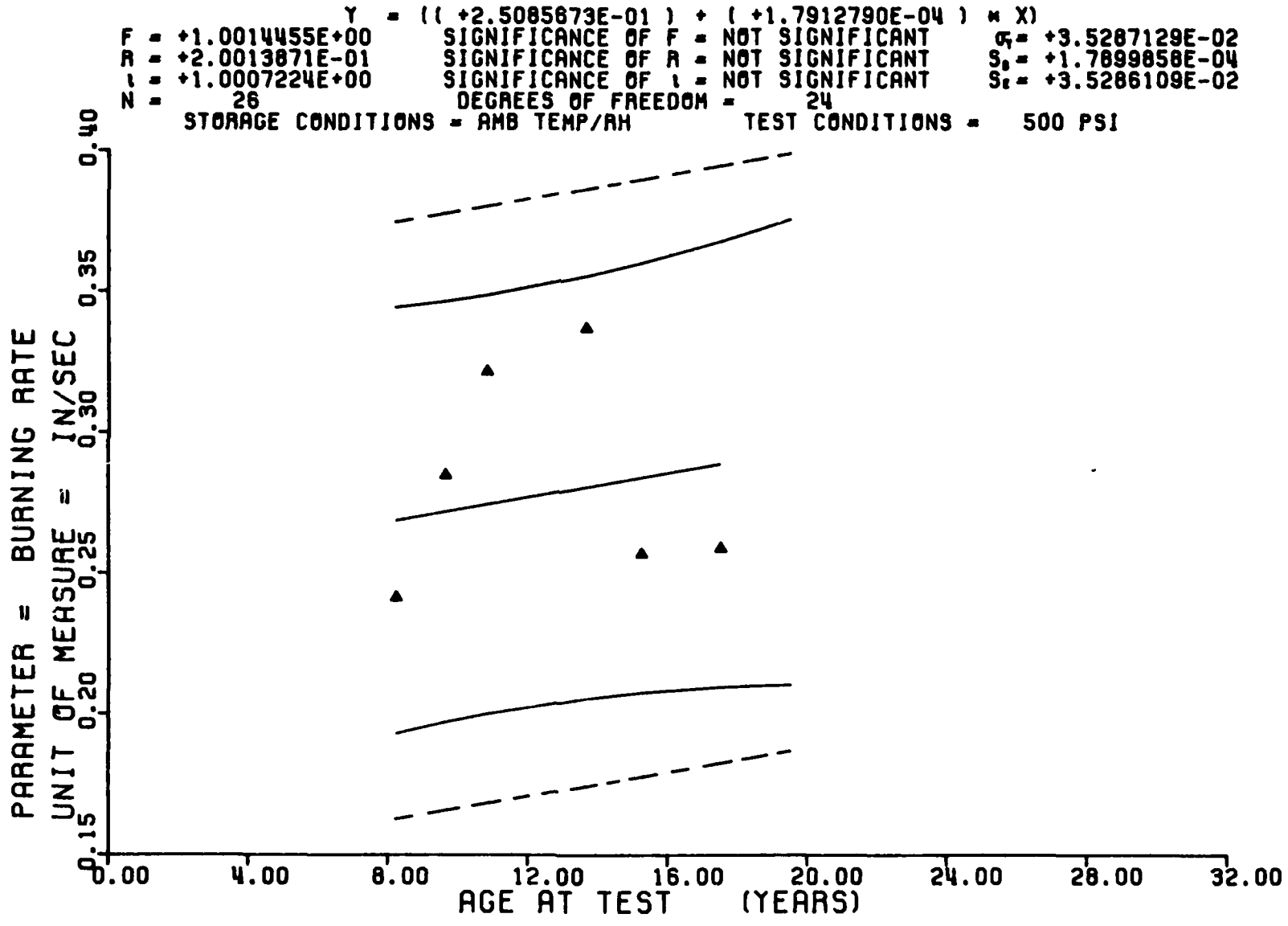
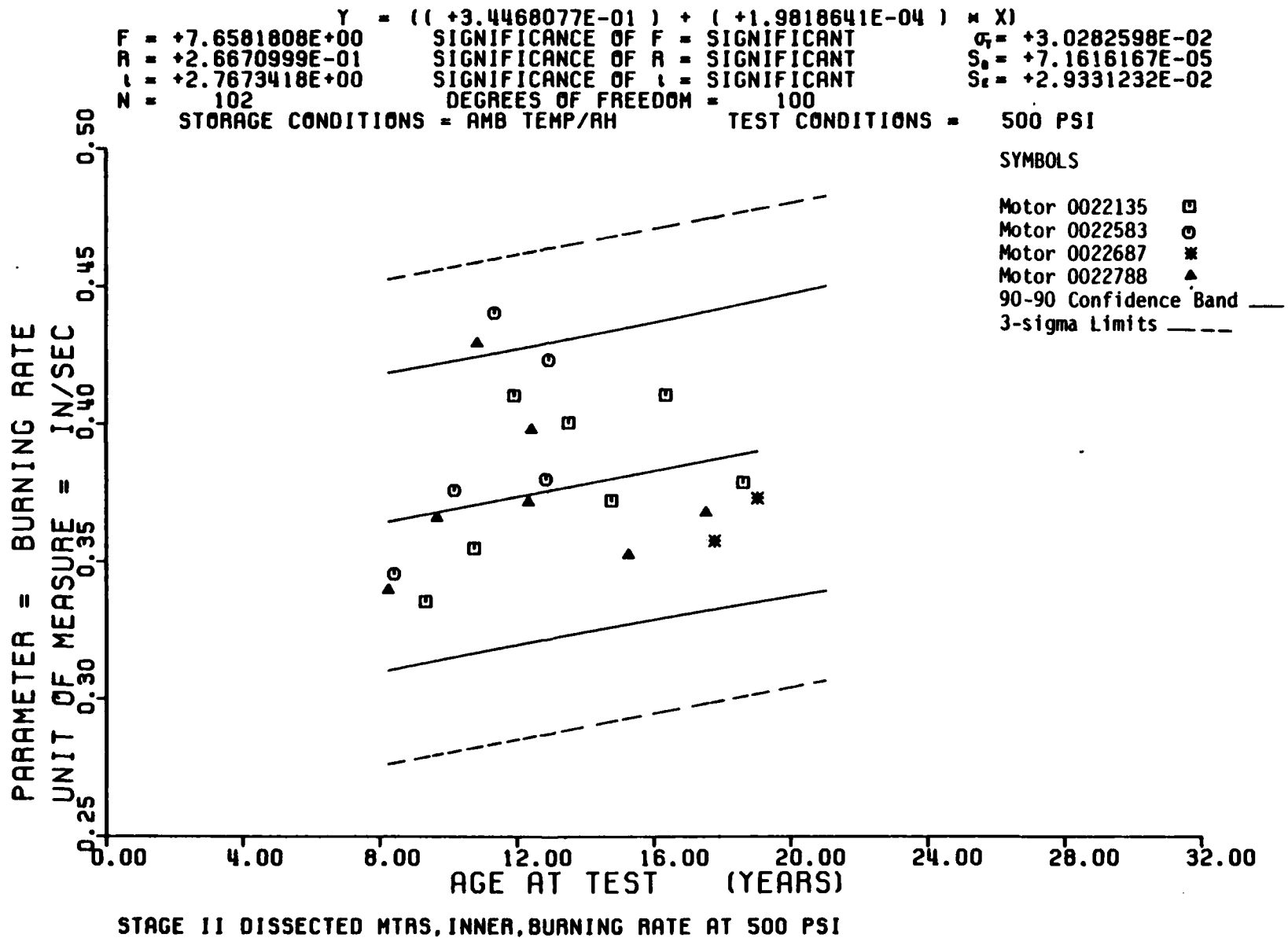

Y = ((+2.5085673E-01) + (+1.7912790E-04) * X)
F = +1.0014455E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σ = +3.5287129E-02
R = +2.0013871E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT S0 = +1.7899858E-04
t = +1.0007224E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +3.5286109E-02
N = 26 DEGREES OF FREEDOM = 24
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 500 PSI
PARAMETER = BURNING RATE
UNIT OF MEASURE = IN/SEC
0.40
0.35
0.30
0.25
0.20
0.15
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSECTED MTRS,OUTER,BURNING RATE AT 500 PSI <0022788>

Figure 144



STAGE II DISSECTED MTRS, INNER, BURNING RATE AT 500 PSI

Figure 145

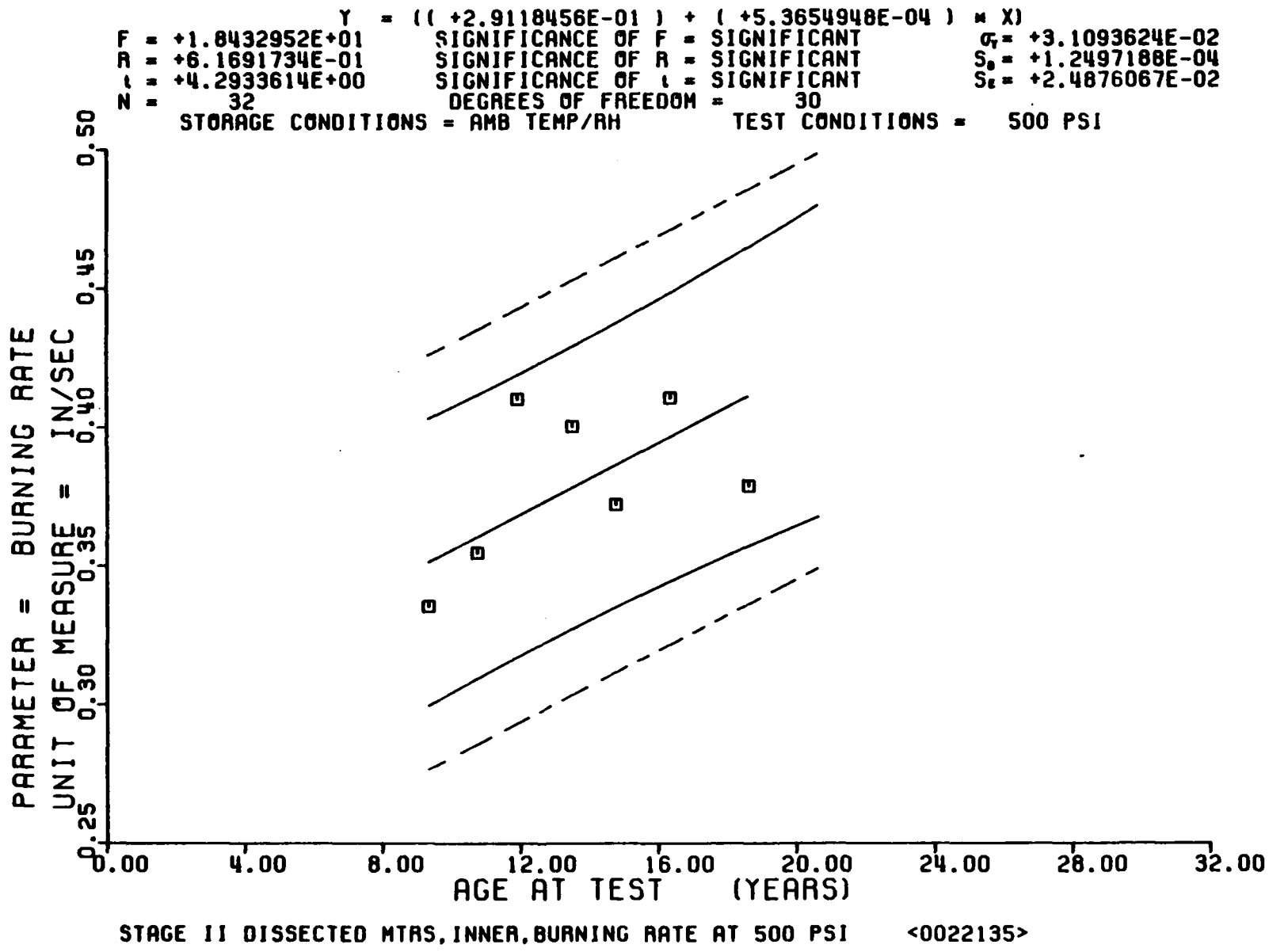

Y = ((+2.9118456E-01) + (+5.3654948E-04) * X)
F = +1.8432952E+01 SIGNIFICANCE OF F = SIGNIFICANT σt = +3.1093624E-02
R = +6.1691734E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.2497188E-04
t = +4.2933614E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +2.4876067E-02
N = 32 DEGREES OF FREEDOM = 30
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 500 PSI
PARAMETER = BURNING RATE
UNIT OF MEASURE = IN/SEC
0.25
0.30
0.35
0.40
0.45
0.50
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSECTED MTRS, INNER, BURNING RATE AT 500 PSI <0022135>

Figure 146

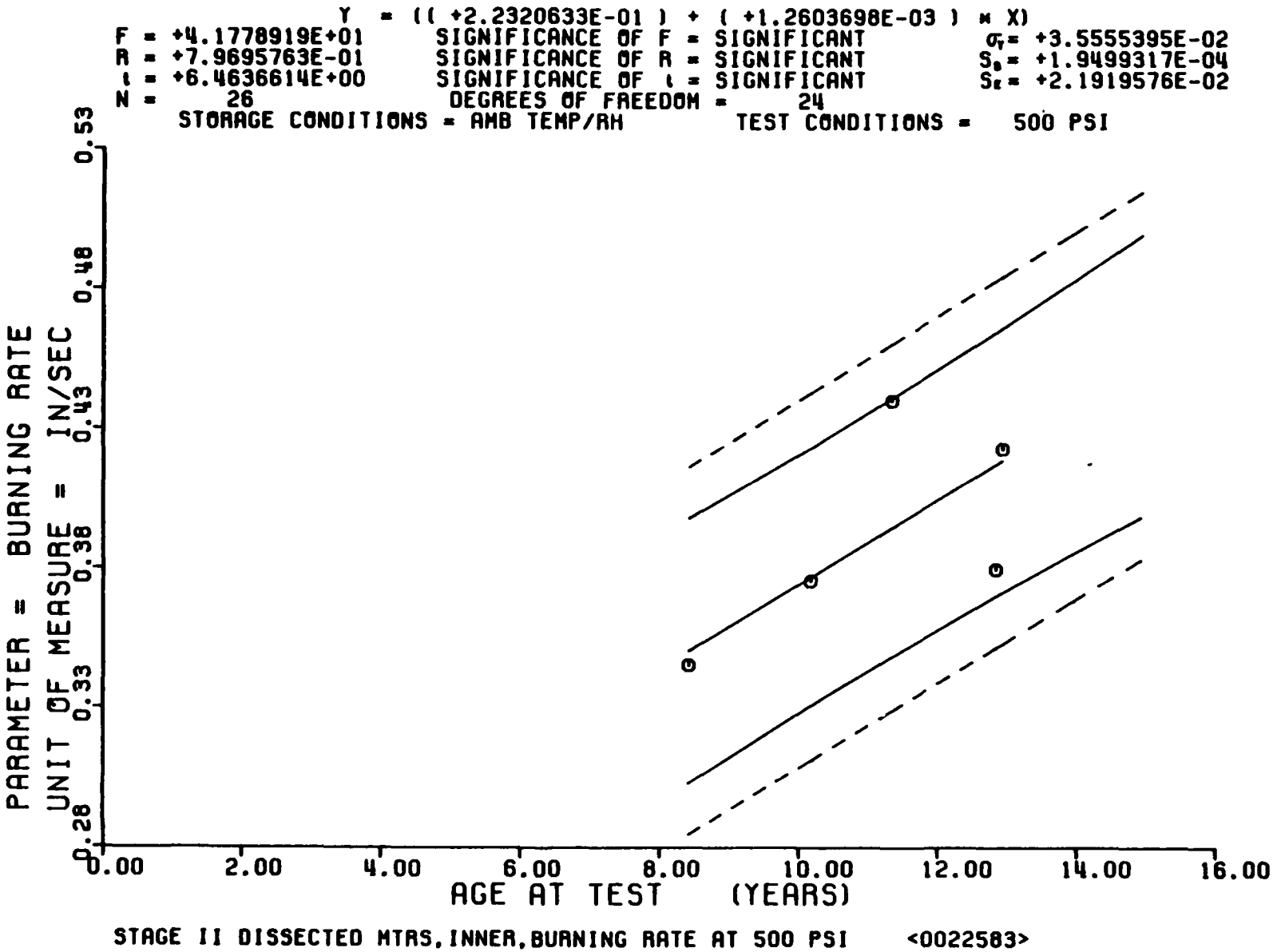

Y = ((+2.2320633E-01) + (+1.2603698E-03) * X)
F = +4.1778919E+01 SIGNIFICANCE OF F = SIGNIFICANT σr= +3.5555395E-02
R = +7.9695763E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb= +1.9499317E-04
t = +6.4636614E+00 SIGNIFICANCE OF t = SIGNIFICANT Sx= +2.1919576E-02
N = 26 DEGREES OF FREEDOM = 24
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 500 PSI
PARAMETER = BURNING RATE
UNIT OF MEASURE = IN/SEC
0.53
0.48
0.43
0.38
0.33
0.28
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
STAGE II DISSECTED MTRS, INNER, BURNING RATE AT 500 PSI <0022583>

Figure 147

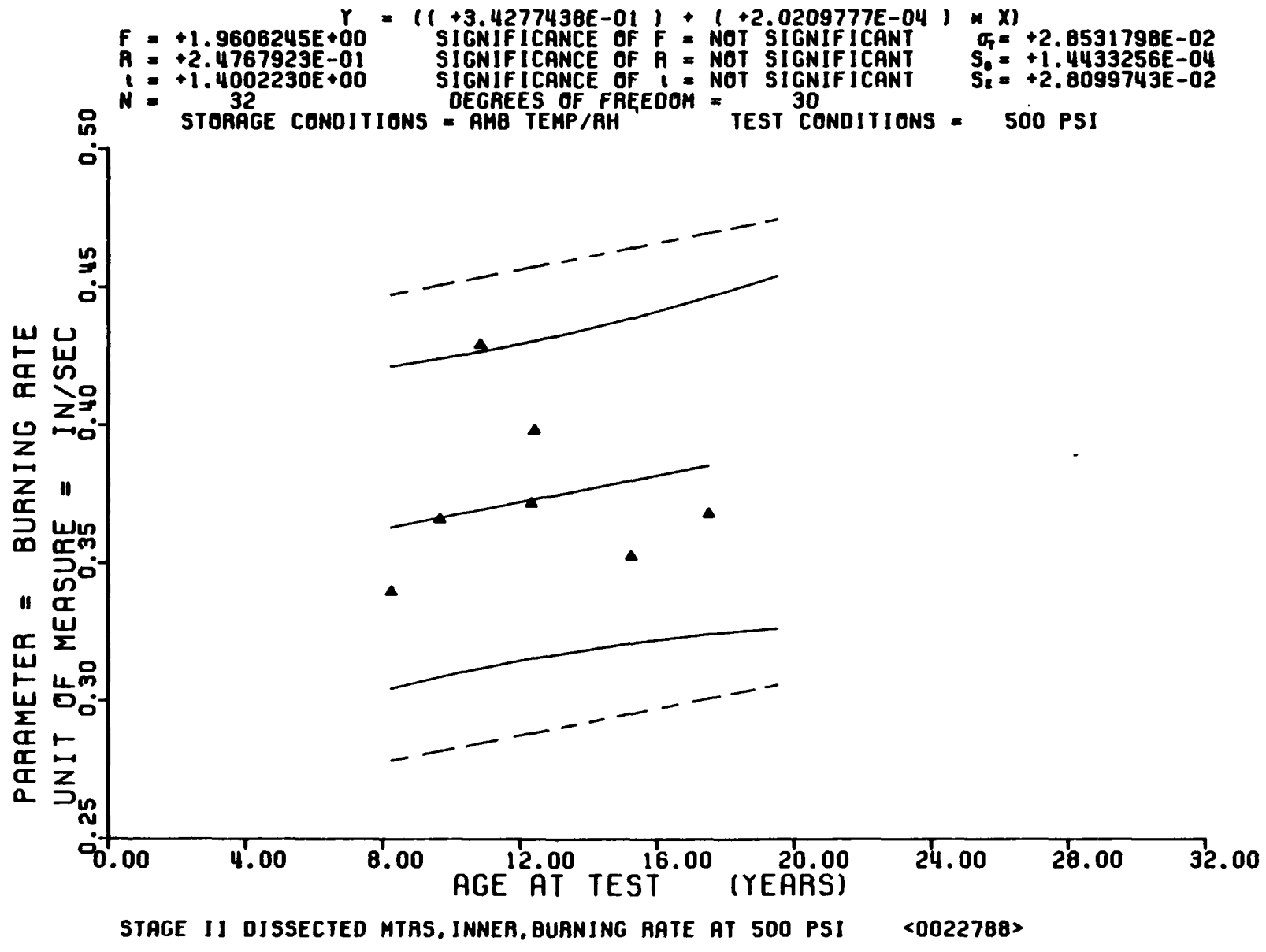
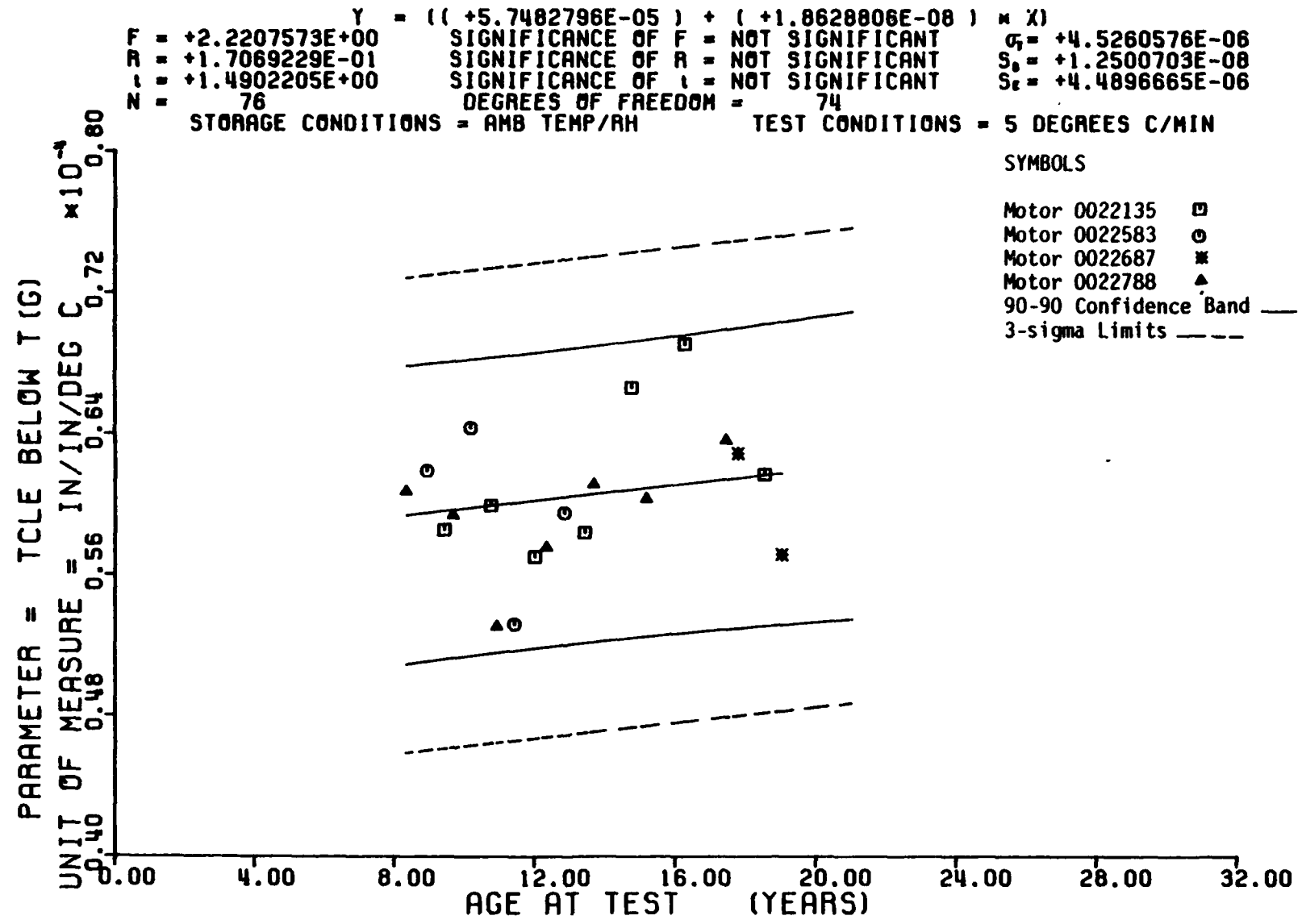
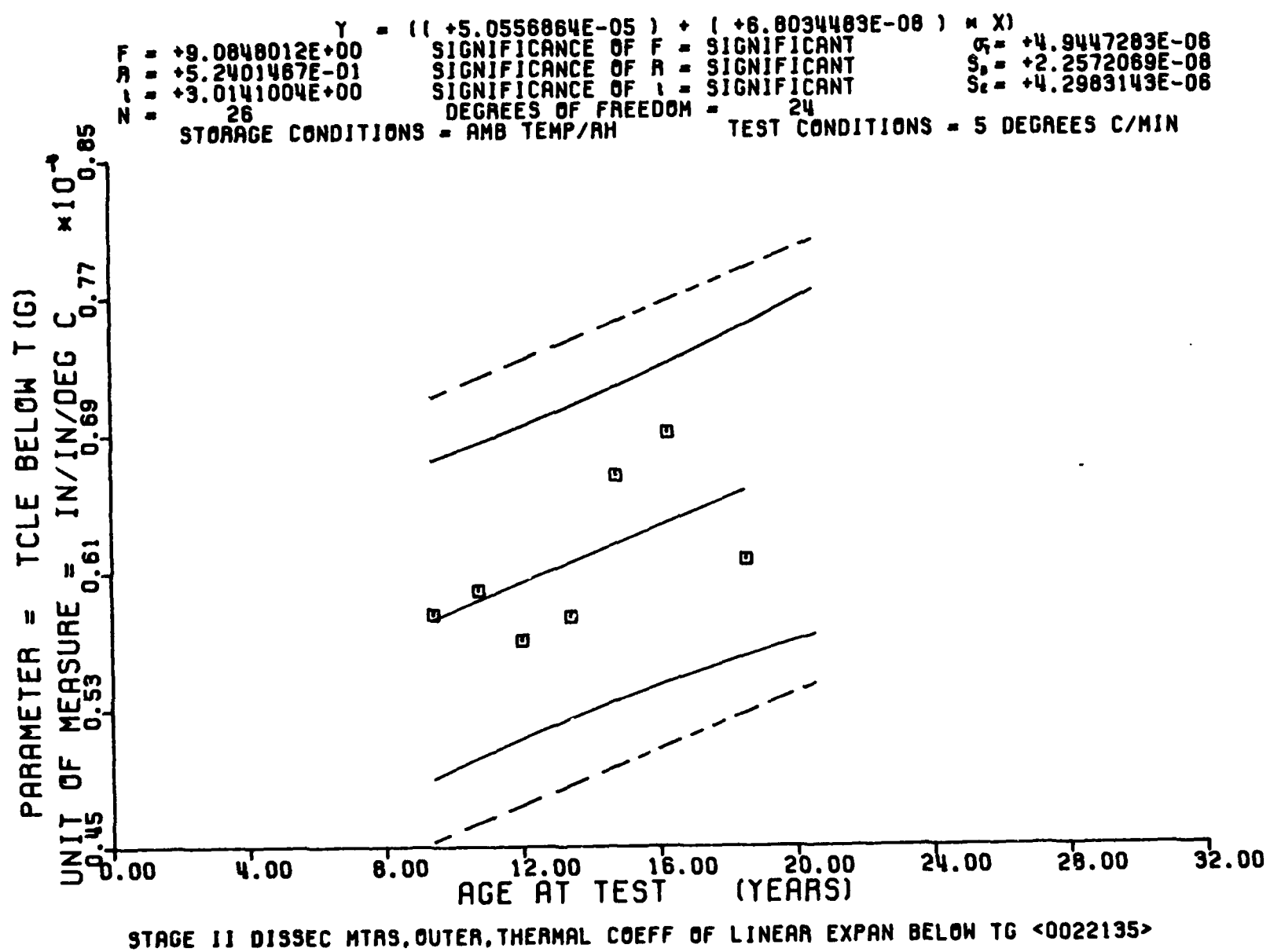

Y = ((+3.4277438E-01) + (+2.0209777E-04) * X)
F = +1.9606245E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +2.8531798E-02
R = +2.4767923E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +1.4433256E-04
t = +1.4002230E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +2.8099743E-02
N = 32 DEGREES OF FREEDOM = 30
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 500 PSI
PARAMETER = BURNING RATE
UNIT OF MEASURE = IN/SEC
0.25
0.30
0.35
0.40
0.45
0.50
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSECTED MTRS, INNER, BURNING RATE AT 500 PSI <0022788>

Figure 148



STAGE II DISSECTED MTRS, OUTER, THERMAL COEFFICIENT OF LINEAR EXPANSION BELOW TG

Figure 149



STAGE II DISSEC MTRS,OUTER,THERMAL COEFF OF LINEAR EXPAN BELOW TG <0022135>

Figure 150

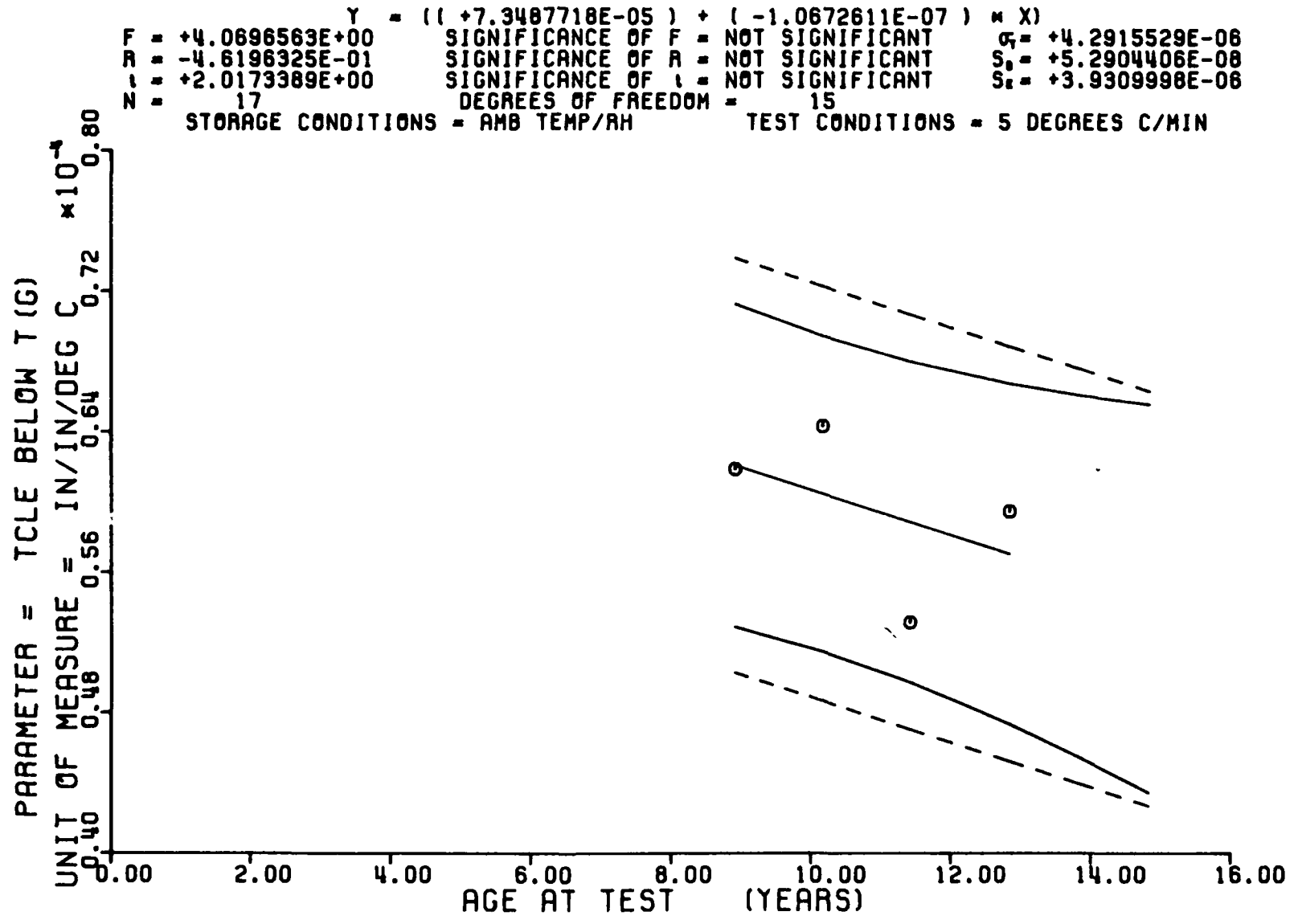

Y = ((+7.3487718E-05) + (-1.0672611E-07) * X)
F = +4.0696563E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +4.2915529E-06
R = -4.6196325E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT So = +5.2904406E-08
t = +2.0173389E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sz = +3.9309998E-06
N = 17 DEGREES OF FREEDOM = 15
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN
PARAMETER = TCLE BELOW T(G)
UNIT OF MEASURE = IN/IN/DEG C x10⁻⁴
0.80
0.72
0.64
0.56
0.48
0.40
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
STAGE II DISSEC MTRS,OUTER,THERMAL COEFF OF LINEAR EXPAN BELOW TG <0022583>

Figure 151

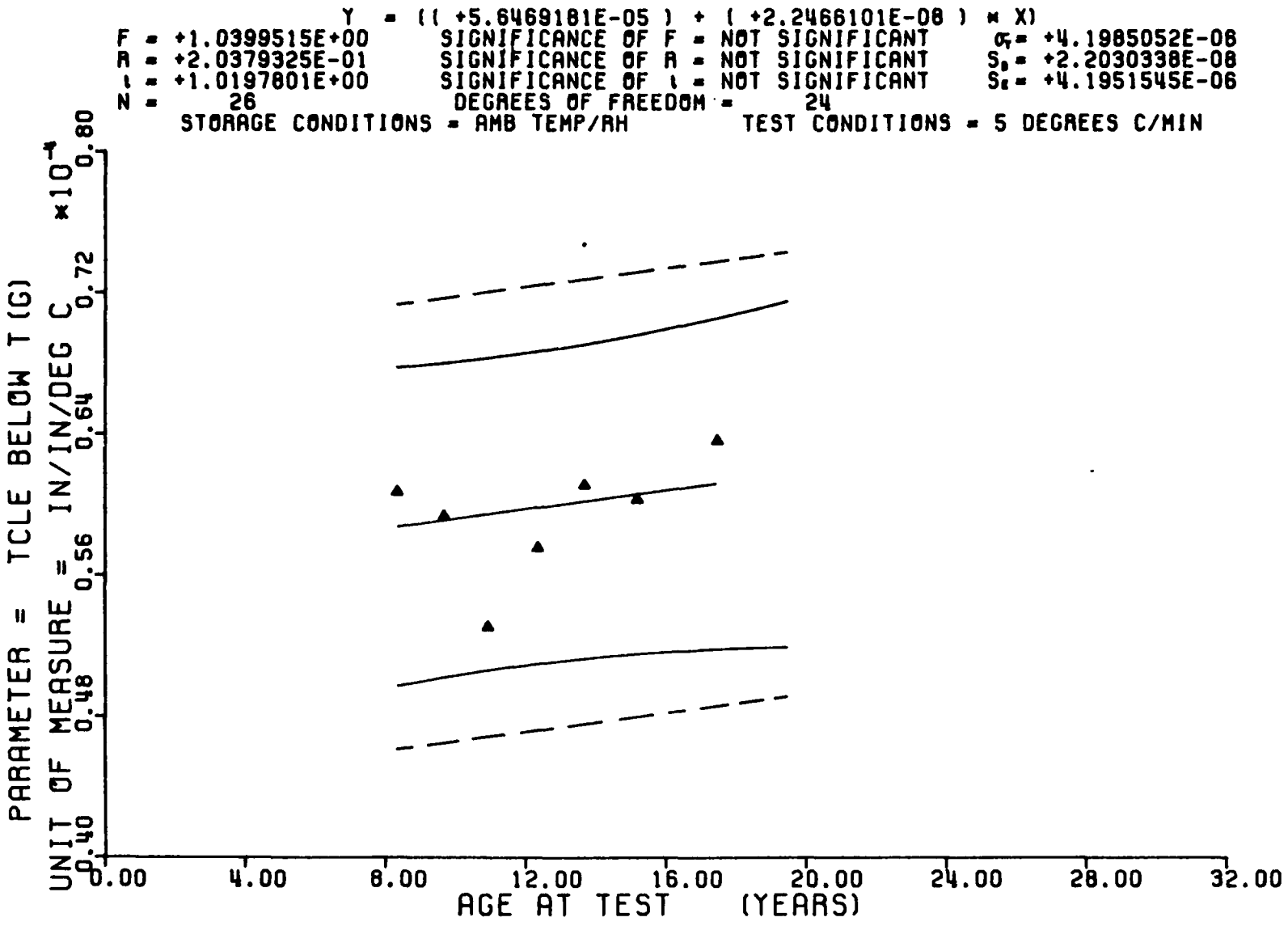

Y = ((+5.6469181E-05) + (+2.2466101E-08) * X)
F = +1.0399515E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +4.1985052E-06
R = +2.0379325E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +2.2030338E-08
t = +1.0197801E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +4.1951545E-06
N = 26 DEGREES OF FREEDOM = 24
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN
PARAMETER = TCLE BELOW T (G)
UNIT OF MEASURE = IN/IN/DEG C *10⁻⁴
0.80
0.72
0.64
0.56
0.48
0.40
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSEC MTRS,OUTER,THERMAL COEFF OF LINEAR EXPAN BELOW TG <0022788>

Figure 152

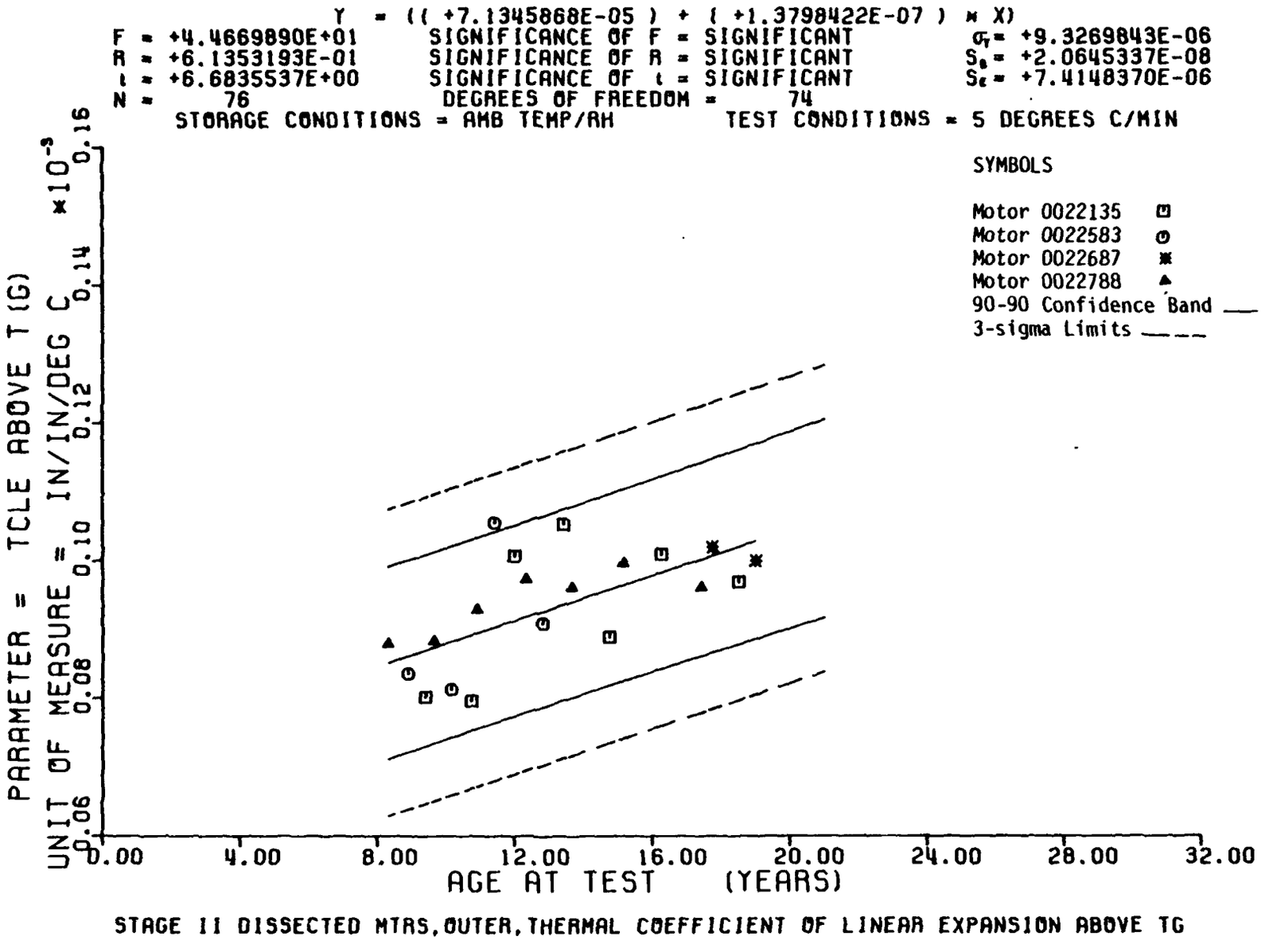

Y = ((+7.1345868E-05) + (+1.3798422E-07) * X)
F = +4.4669890E+01 SIGNIFICANCE OF F = SIGNIFICANT σT = +9.3269843E-06
R = +6.1353193E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +2.0645337E-08
t = +6.6835537E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +7.4148370E-06
N = 76 DEGREES OF FREEDOM = 74
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = TCLE ABOVE T (G)
UNIT OF MEASURE = IN/IN/DEG C
×10⁻³
0.06
0.08
0.10
0.12
0.14
0.16
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSECTED MTRS, OUTER, THERMAL COEFFICIENT OF LINEAR EXPANSION ABOVE TG

Figure 153

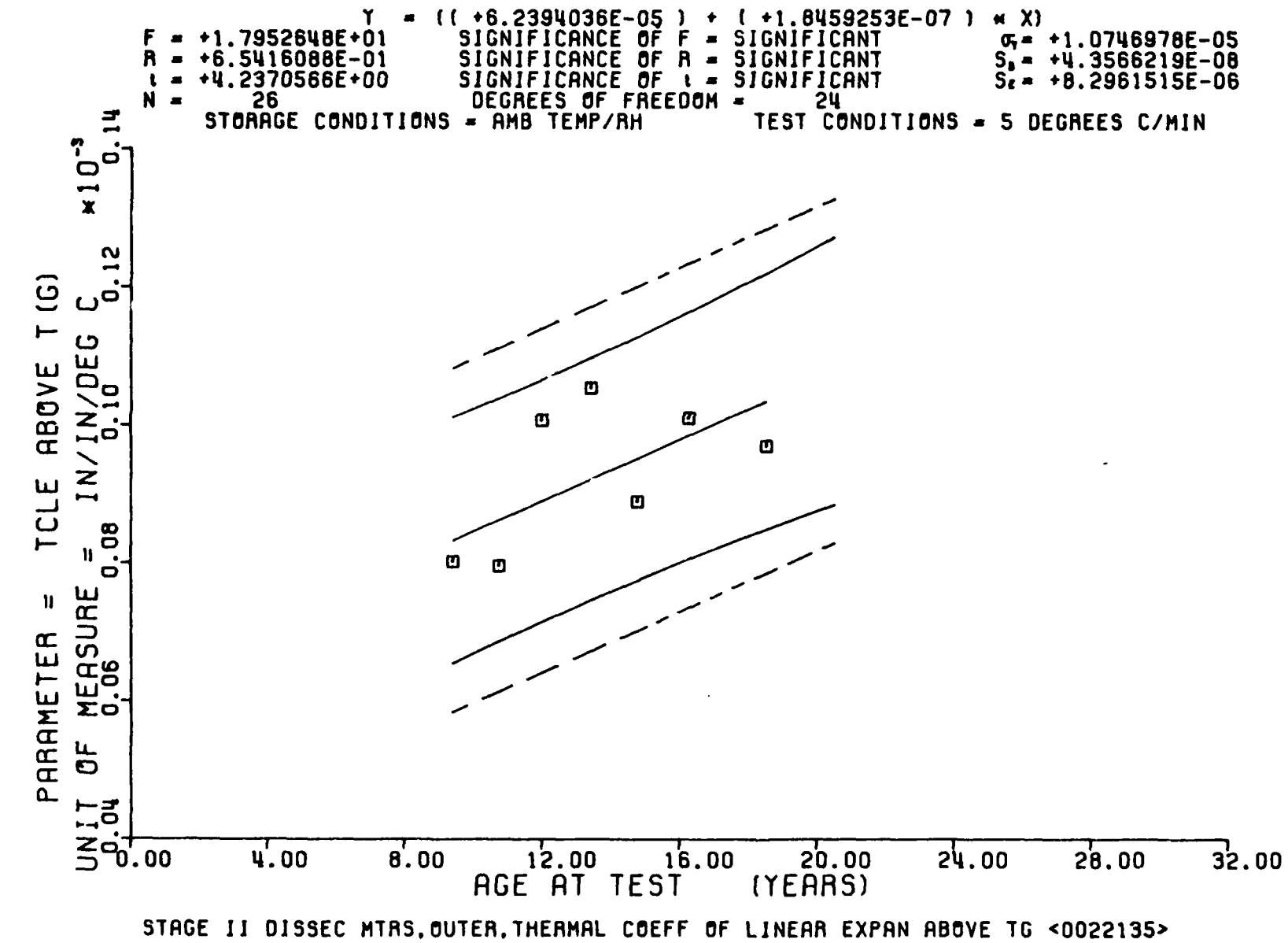
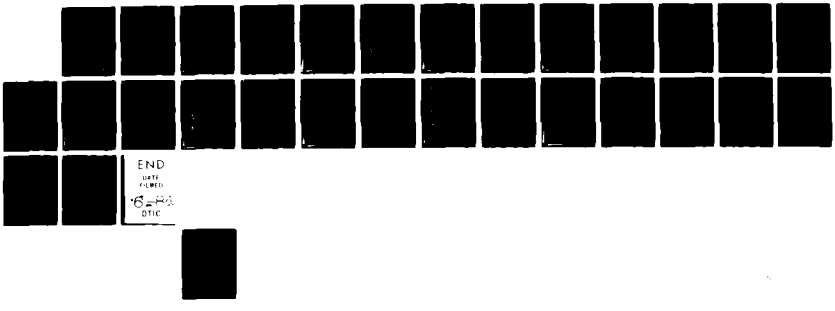

Y = ((+6.2394036E-05) + (+1.8459253E-07) * X)
F = +1.7952648E+01 SIGNIFICANCE OF F = SIGNIFICANT σ_r = +1.0746978E-05
R = +6.5416088E-01 SIGNIFICANCE OF R = SIGNIFICANT S_b = +4.3566219E-08
t = +4.2370566E+00 SIGNIFICANCE OF t = SIGNIFICANT S_z = +8.2961515E-06
N = 26 DEGREES OF FREEDOM = 24
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN
PARAMETER = TCLE ABOVE T(G)
UNIT OF MEASURE = IN/IN/DEG C
×10⁻³
0.14
0.12
0.10
0.08
0.06
0.04
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSEC MTRS,OUTER,THERMAL COEFF OF LINEAR EXPAN ABOVE TG <0022135>

Figure 154

AD-A140 337 LGM-30B STAGE II DISSECTED MOTOR TEST REPORT(U) OGDEN AIR LOGISTICS CENTER HILL AFB UT PROPELLANT ANALYSIS LAB E M DALABA FEB 84 MANPA-496(84) 3/3

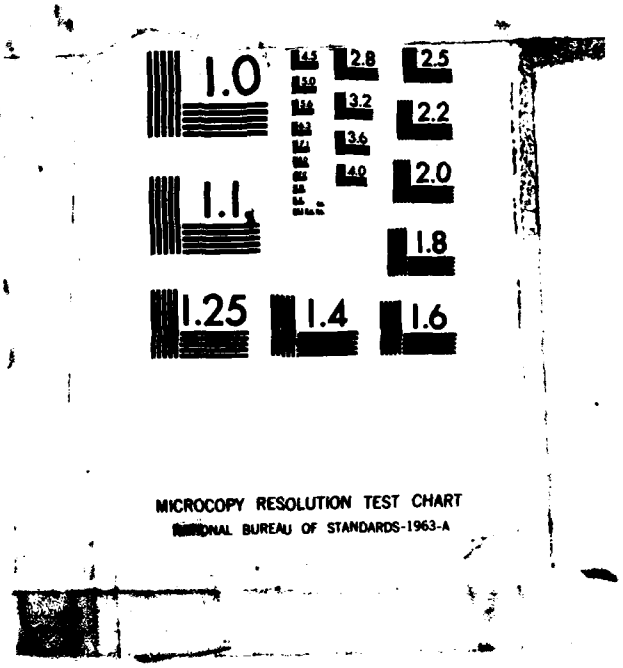
UNCLASSIFIED F/G 21/8.2 NL



END

DATE FILMED

DTIC



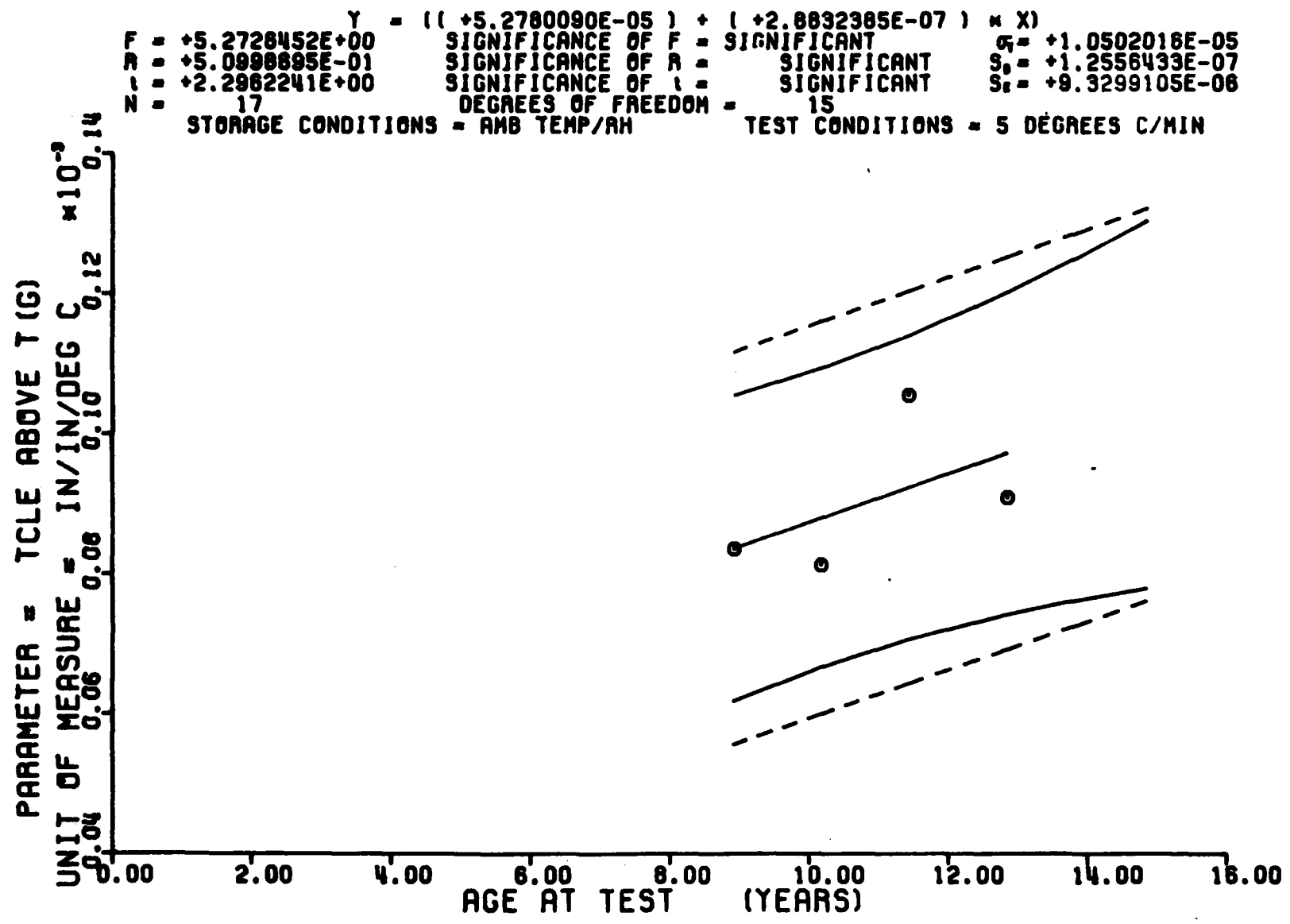

Y = ((+5.2780090E-05) + (+2.8832385E-07) * X)
F = +5.2728452E+00 SIGNIFICANCE OF F = SIGNIFICANT σ = +1.0502016E-05
R = +5.0998695E-01 SIGNIFICANCE OF R = SIGNIFICANT S0 = +1.2556433E-07
t = +2.2962241E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +9.3299105E-06
N = 17 DEGREES OF FREEDOM = 15
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN
PARAMETER = TCLE ABOVE T(G)
UNIT OF MEASURE = IN/IN/DEG C ×10⁻³
0.14
0.12
0.10
0.08
0.06
0.04
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
STAGE II DISSEC MTRS,OUTER,THERMAL COEFF OF LINEAR EXPAN ABOVE TG <0022503>

Figure 155

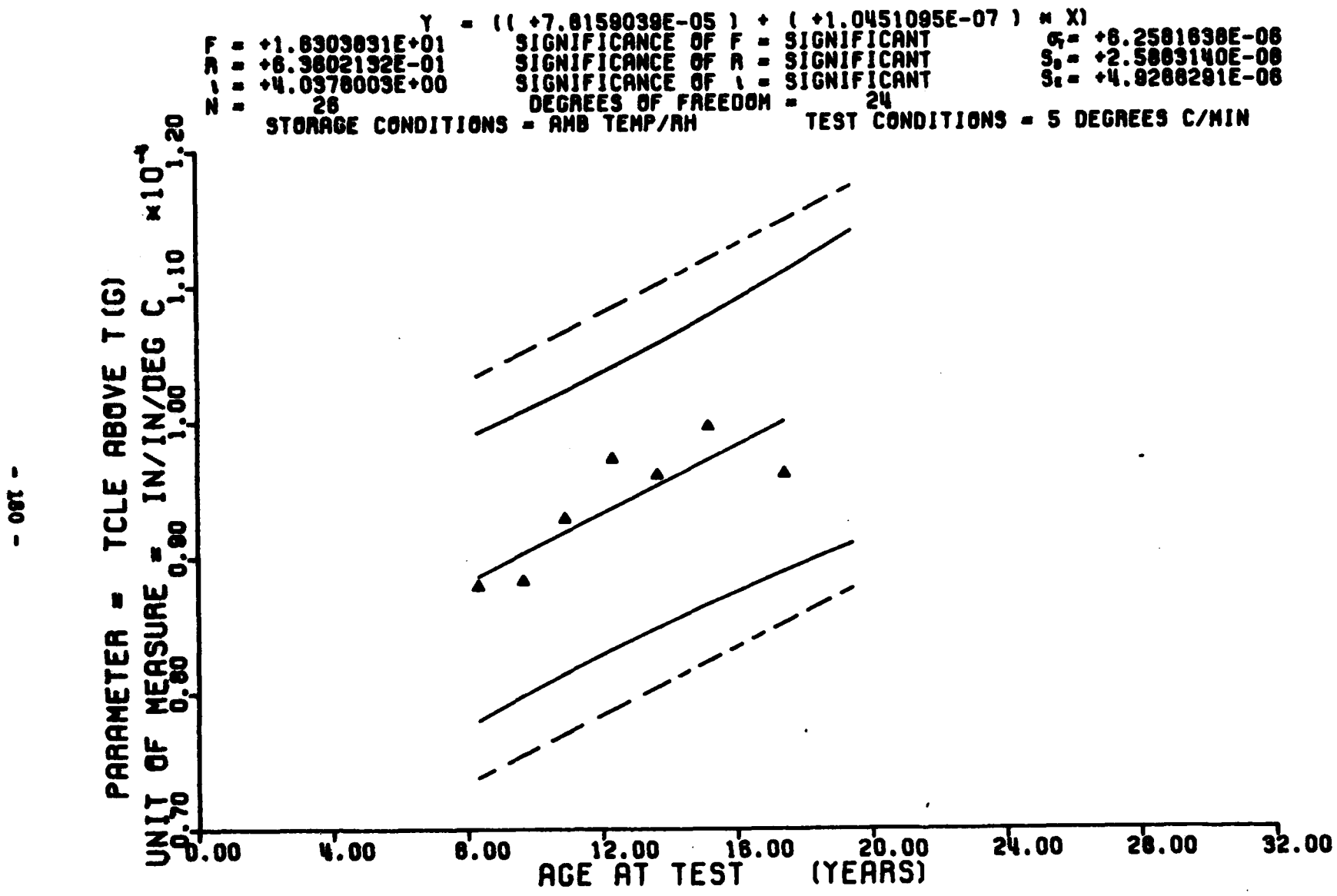

Y = ((+7.8159039E-05) + (+1.0451095E-07) * X)
F = +1.6303831E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +6.3802132E-01 SIGNIFICANCE OF R = SIGNIFICANT
N = 26 DEGREES OF FREEDOM = 24
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN
PARAMETER = TCLE ABOVE T(G)
UNIT OF MEASURE = IN/IN/DEG C
0.70
0.80
0.90
1.00
1.10
1.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSEC MTRS,OUTER,THERMAL COEFF OF LINEAR EXPAN ABOVE TG <0022708>

Figure 156

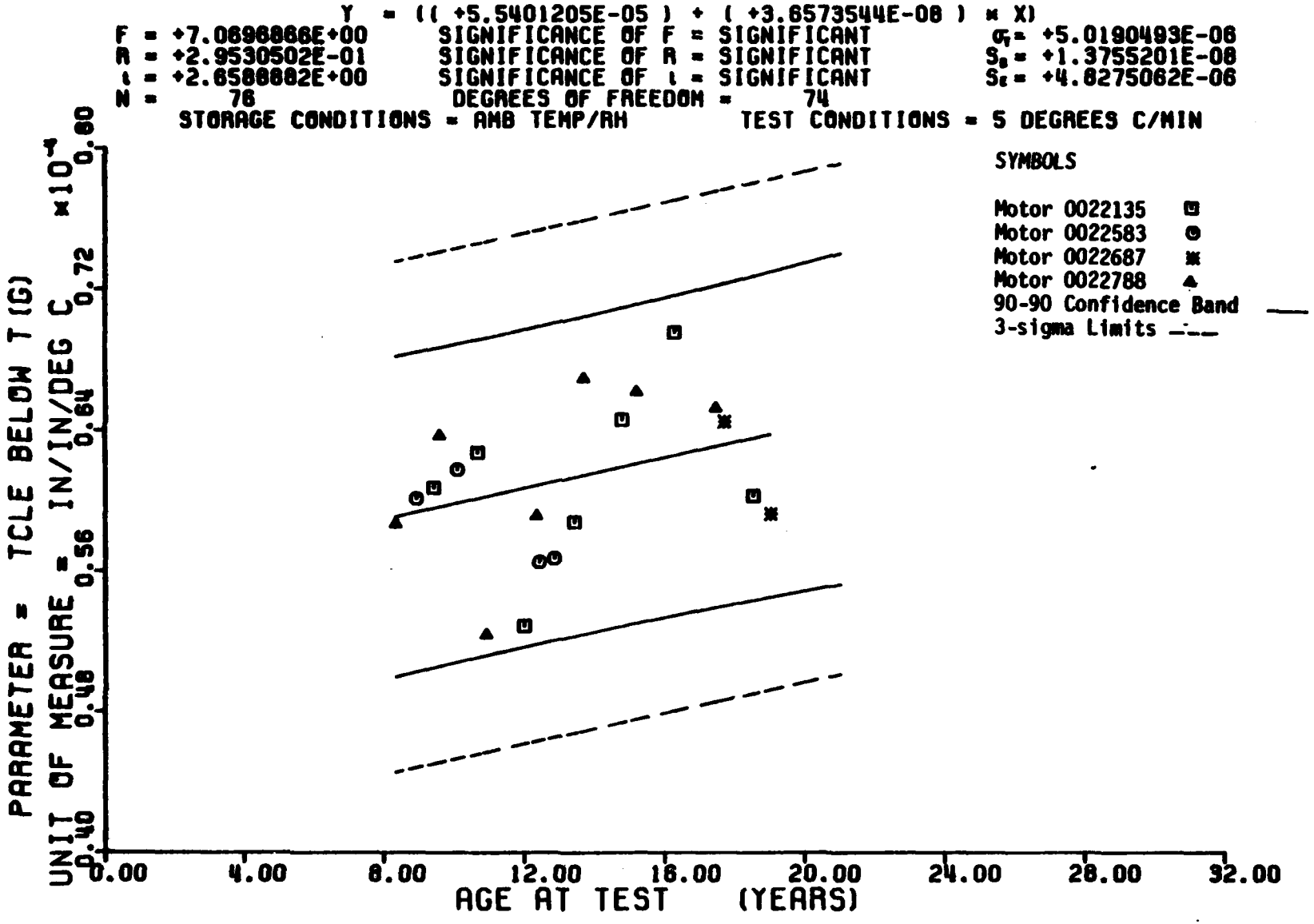

Y = ((+5.5401205E-05) + (+3.6573544E-08) * X)
F = +7.0696866E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +2.9530502E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.6588682E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 76 DEGREES OF FREEDOM = 74
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN
σf = +5.0190493E-06
Sb = +1.3755201E-08
Sε = +4.8275062E-06
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = TCLE BELOW T(G)
UNIT OF MEASURE = IN/IN/DEG C ×10⁻⁴
0.40
0.48
0.56
0.64
0.72
0.80
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSECTED MTRS, INNER, THERMAL COEFFICIENT OF LINEAR EXPANSION BELOW TG

Figure 157

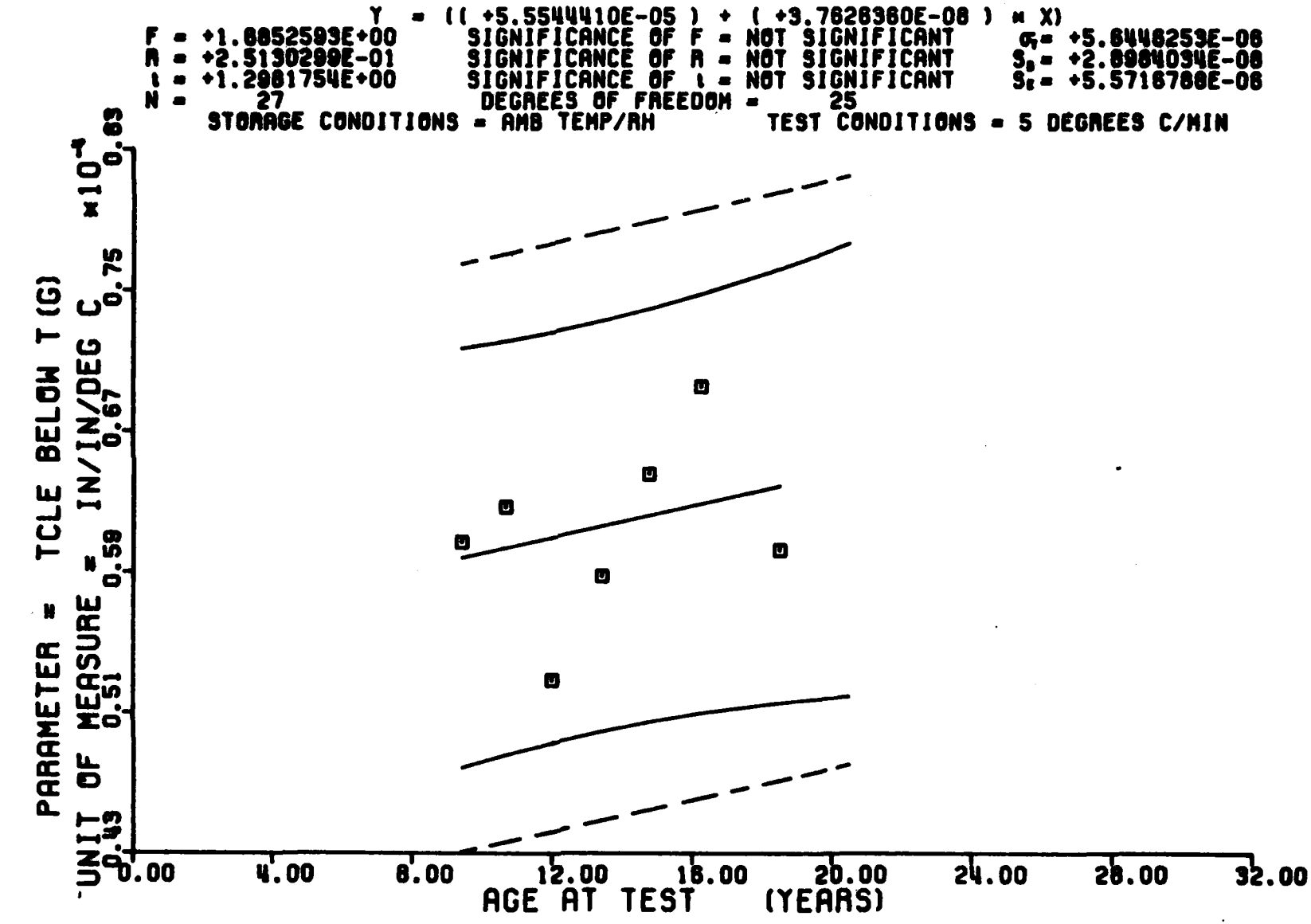
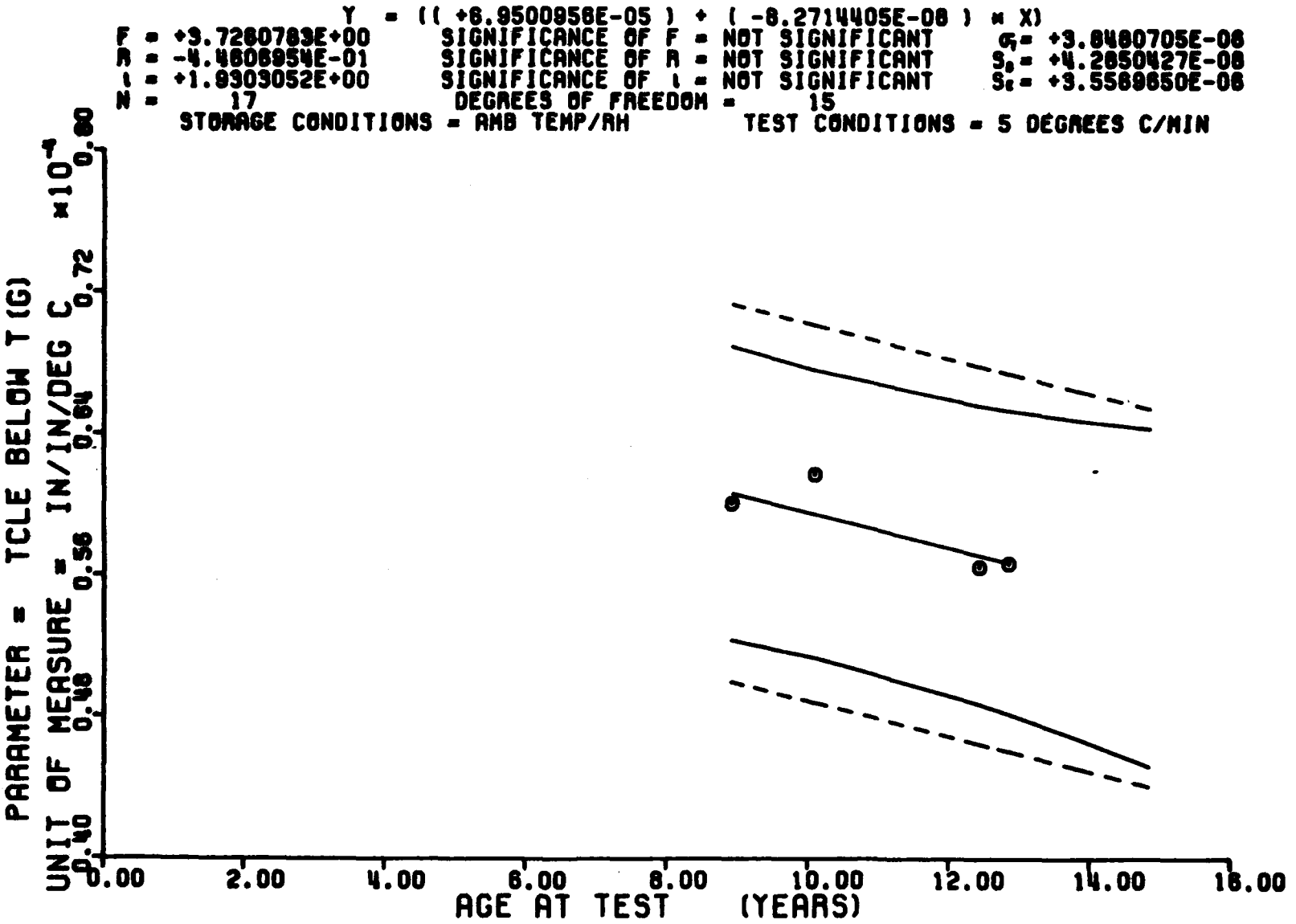

Y = ((+5.5544410E-05) + (+3.7626360E-08) * X)
F = +1.8852593E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +5.8446253E-06
R = +2.5130289E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +2.8984094E-08
t = +1.2981754E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sr = +5.5716788E-08
N = 27 DEGREES OF FREEDOM = 25
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN
PARAMETER = TCLE BELOW T(G)
UNIT OF MEASURE = IN/IN/DEG C x10⁻⁶
0.43
0.51
0.59
0.67
0.75
0.83
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSEC MTRS,INNER,THERMAL COEFF OF LINEAR EXPAN BELOW TG <0022135>

Figure 158



STAGE II DISSEC MTRS, INNER, THERMAL COEFF OF LINEAR EXPAN BELOW TG <0022583>

Figure 159

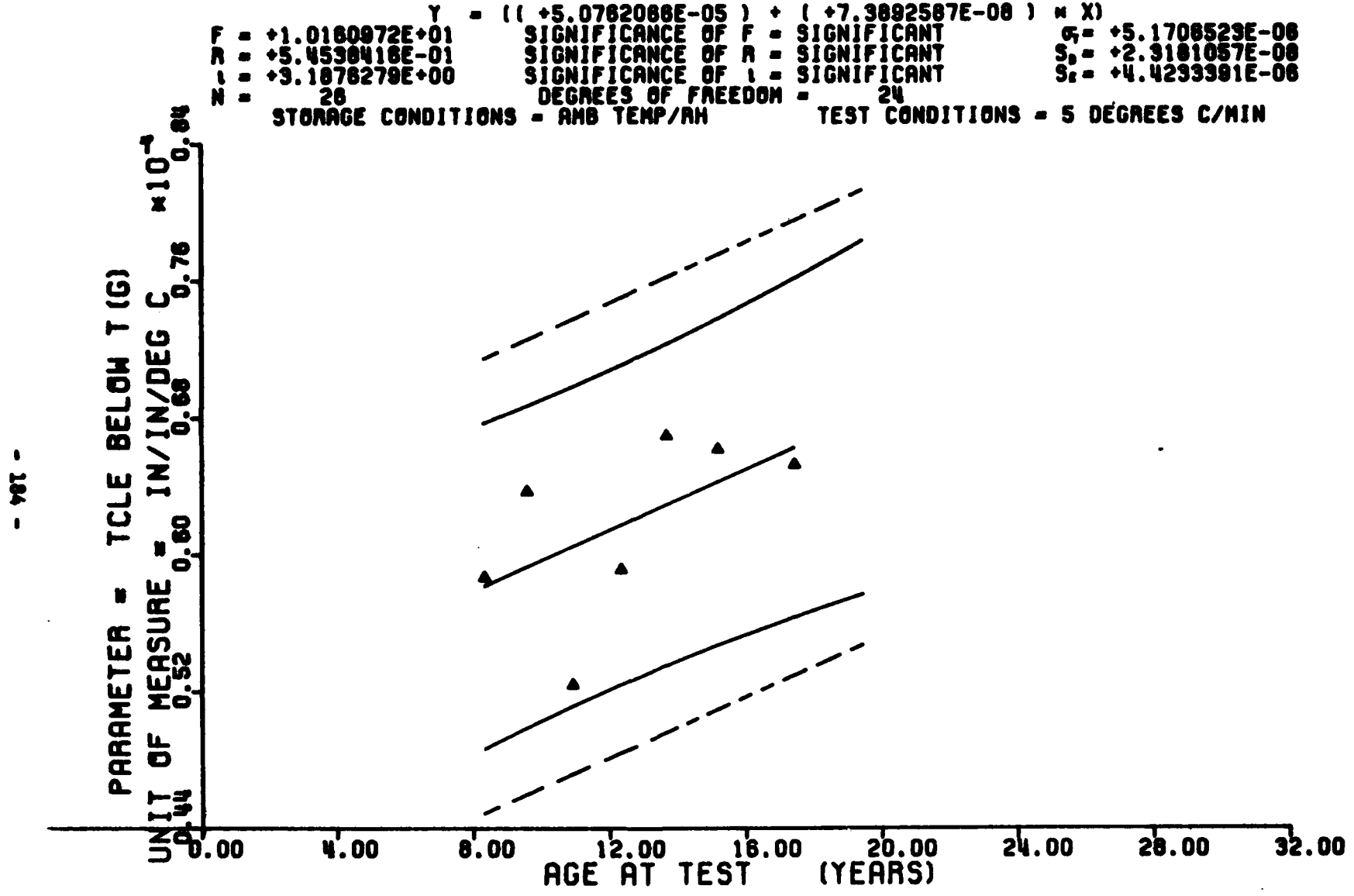
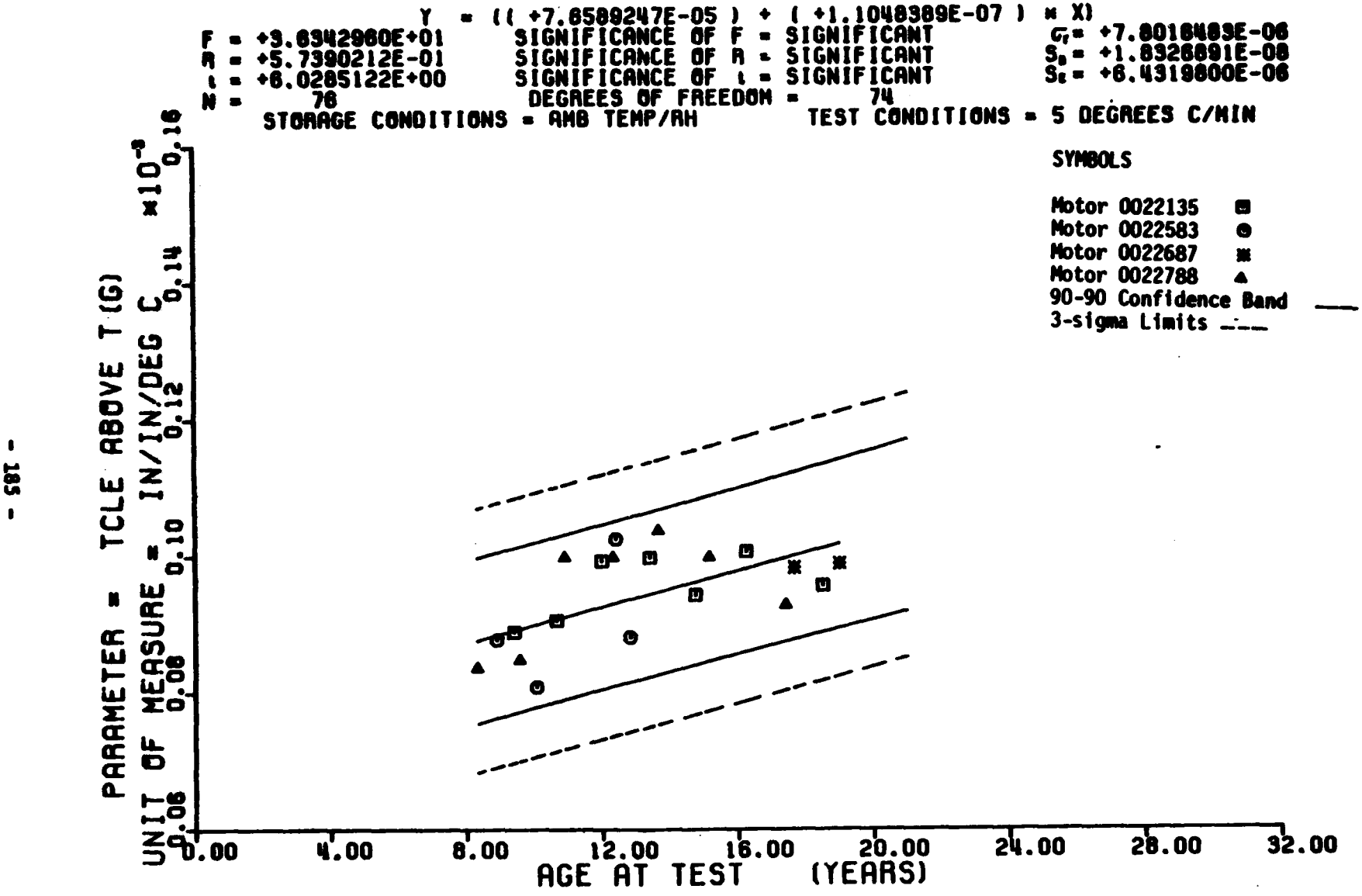
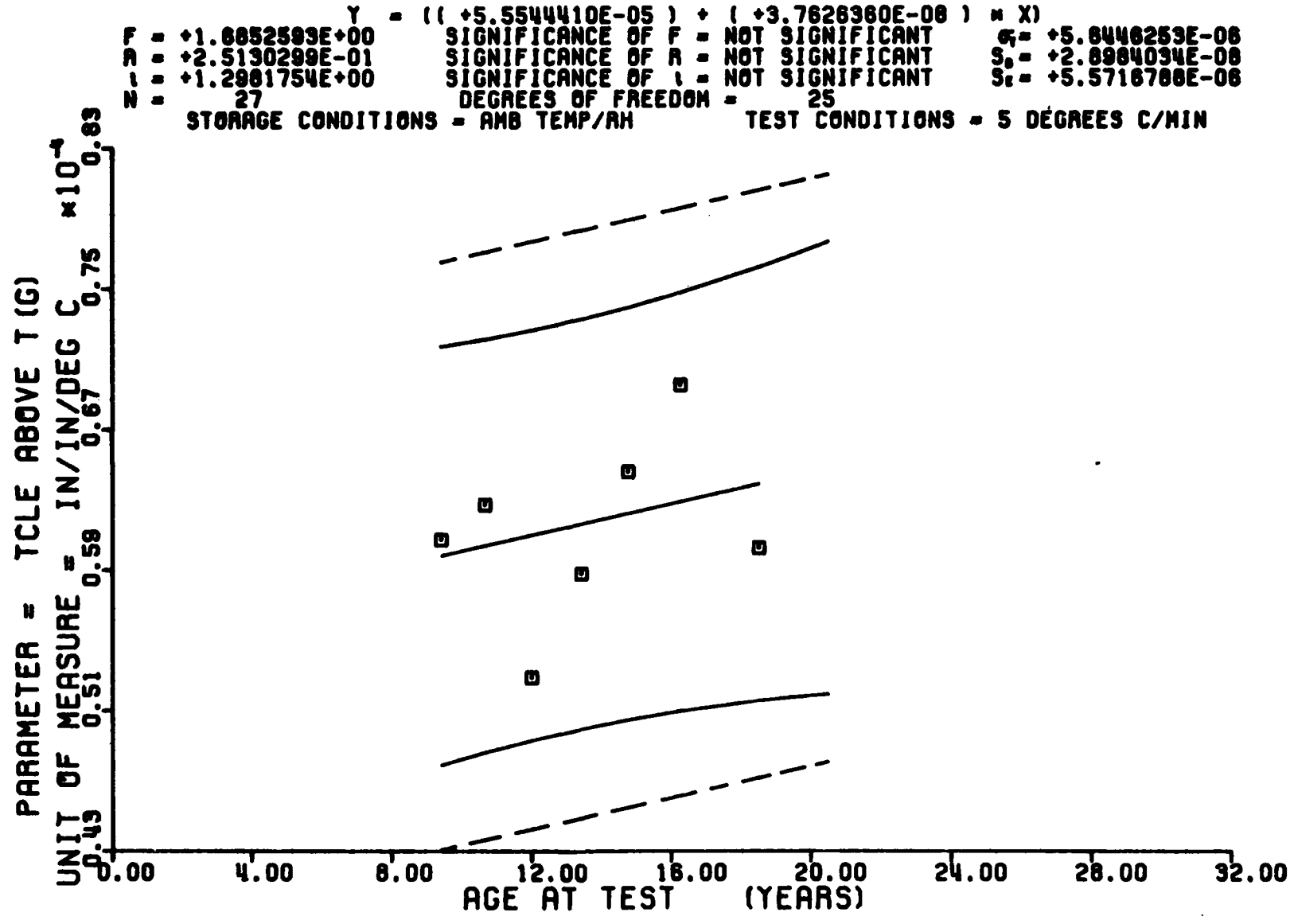

Y = ((+5.0762086E-05) + (+7.3892587E-08) * X)
F = +1.0160972E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +5.4538416E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +3.1876279E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 26 DEGREES OF FREEDOM = 24
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN
σ_t = +5.1706529E-06
S_b = +2.3181057E-08
S_t = +4.4293381E-06
PARAMETER = TCLE BELOW T(G)
UNIT OF MEASURE = IN/IN/DEG C $\times 10^{-6}$
0.44
0.52
0.60
0.68
0.76
0.84
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSEC MTRS, INNER, THERMAL COEFF OF LINEAR EXPAN BELOW TG <0022788>

Figure 160



STAGE II DISSECTED MTRS, INNER, THERMAL COEFFICIENT OF LINEAR EXPANSION ABOVE TG

Figure 161



STAGE II DISSEC MTRS, INNER, THERMAL COEFF OF LINEAR EXPAN ABOVE TG <0022135>

Figure 162

Y = ((+6.9500956E-05) + (-8.2714405E-08) * X)

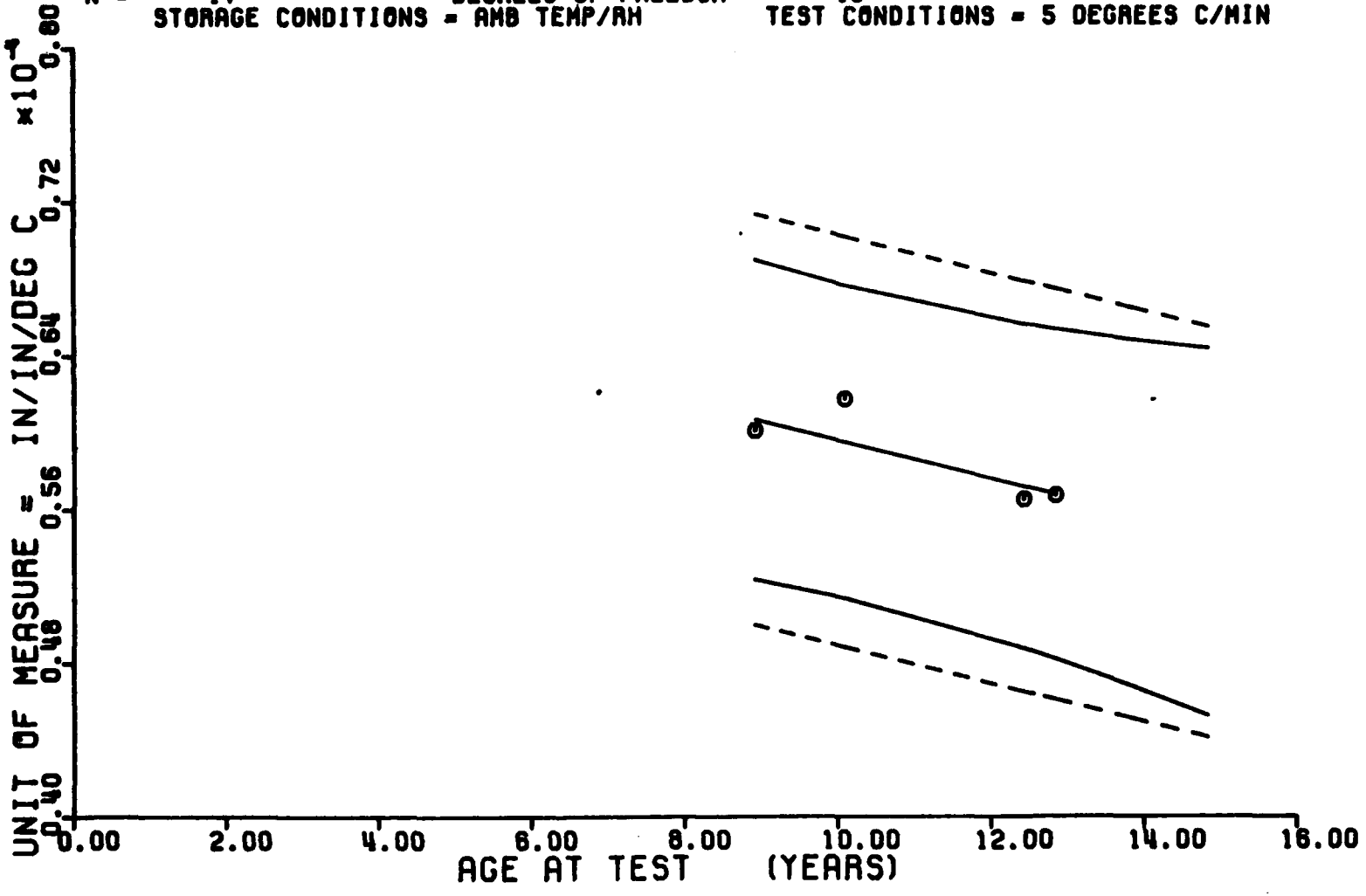
F = +3.7260783E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σ_r = +3.8480705E-06

R = -4.4608854E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT S_b = +4.2850427E-08

t = +1.9303052E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT S_a = +3.5569650E-08

N = 17 DEGREES OF FREEDOM = 15

STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN



STAGE II DISSEC MTRS, INNER, THERMAL COEFF OF LINEAR EXPAN ABOVE TG <0022583>

Figure 163

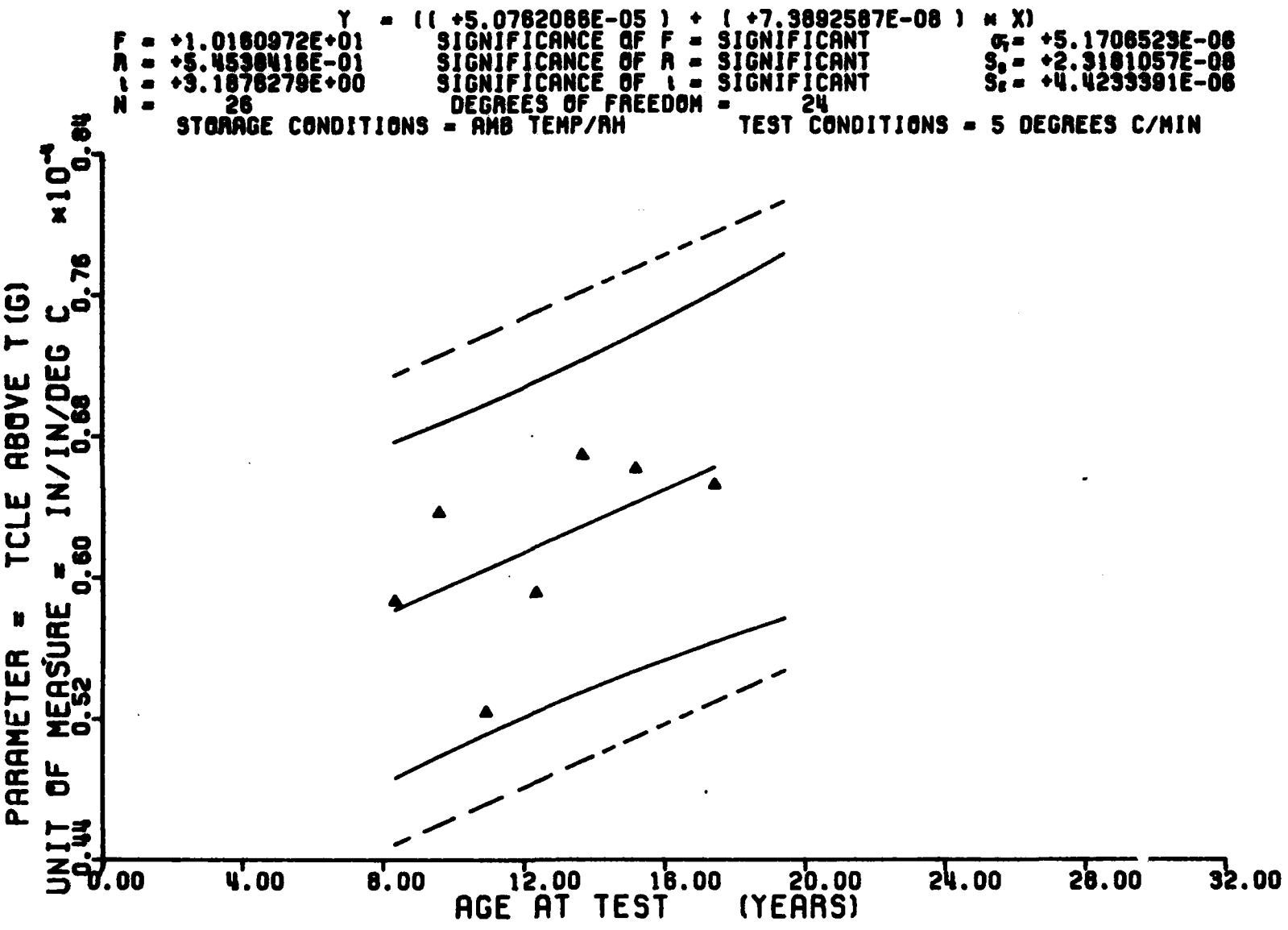

Y = ((+5.0762086E-05) + (+7.3892587E-08) * X)
F = +1.0160972E+01 SIGNIFICANCE OF F = SIGNIFICANT σ1 = +5.1706523E-06
R = +5.4538416E-01 SIGNIFICANCE OF R = SIGNIFICANT S0 = +2.3181057E-08
t = +3.1878279E+00 SIGNIFICANCE OF t = SIGNIFICANT S1 = +4.4233391E-08
N = 26 DEGREES OF FREEDOM = 24
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN
PARAMETER = TCLE ABOVE T(G)
UNIT OF MEASURE = IN/IN/DEG C x10^-4
0.84
0.76
0.68
0.60
0.52
0.44
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE II DISSEC MTRS, INNER, THERMAL COEFF OF LINEAR EXPAN ABOVE TG <0022788>

Figure 164

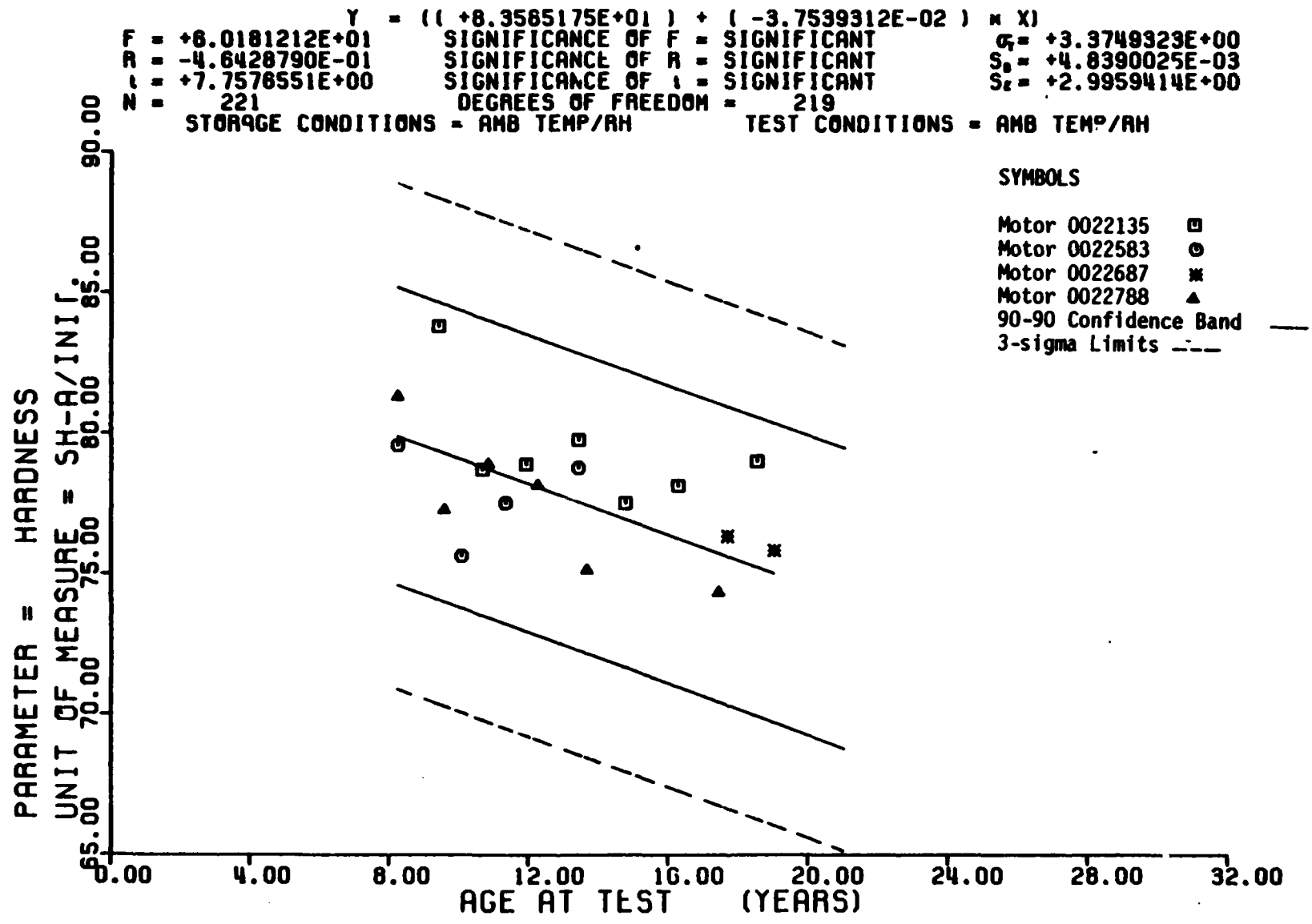
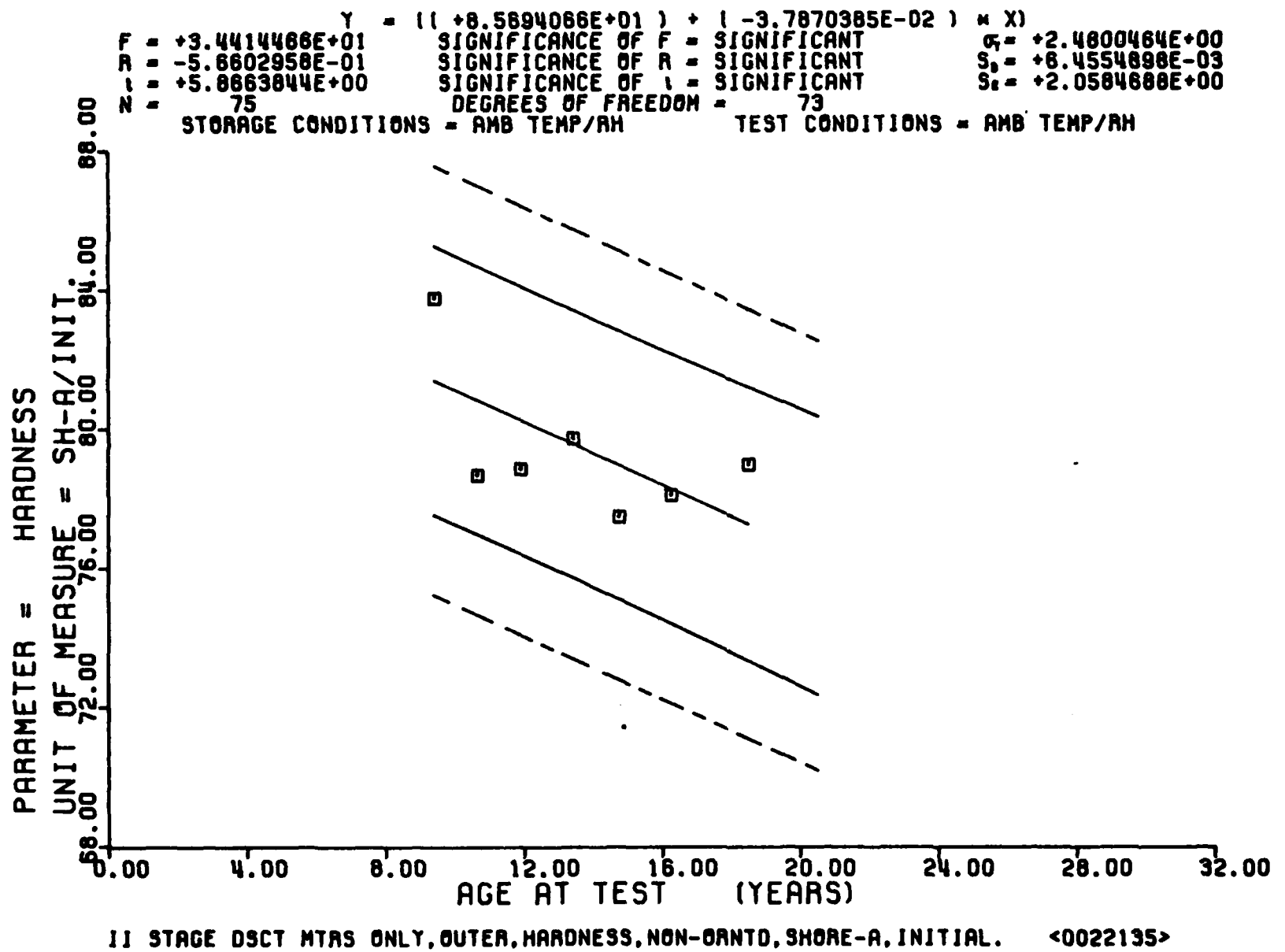

Y = ((+8.3565175E+01) + (-3.7539312E-02) * X)
F = +6.0181212E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = -4.6428790E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +7.7576551E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 221 DEGREES OF FREEDOM = 219
σT = +3.3749323E+00
Sθ = +4.8390025E-03
Sz = +2.9959414E+00
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
SYMBOLS
Motor 0022135
Motor 0022583
Motor 0022687
Motor 0022788
90-90 Confidence Band
3-sigma Limits
PARAMETER = HARDNESS
UNIT OF MEASURE = SH-A/INIT.
65.00
70.00
75.00
80.00
85.00
90.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER, HARDNESS, NON-ORNTD, SHORE-A, INITIAL.

Figure 165



II STAGE DSCT MTRS ONLY, OUTER, HARDNESS, NON-ORNTD, SHORE-A, INITIAL. <0022135>

Figure 166

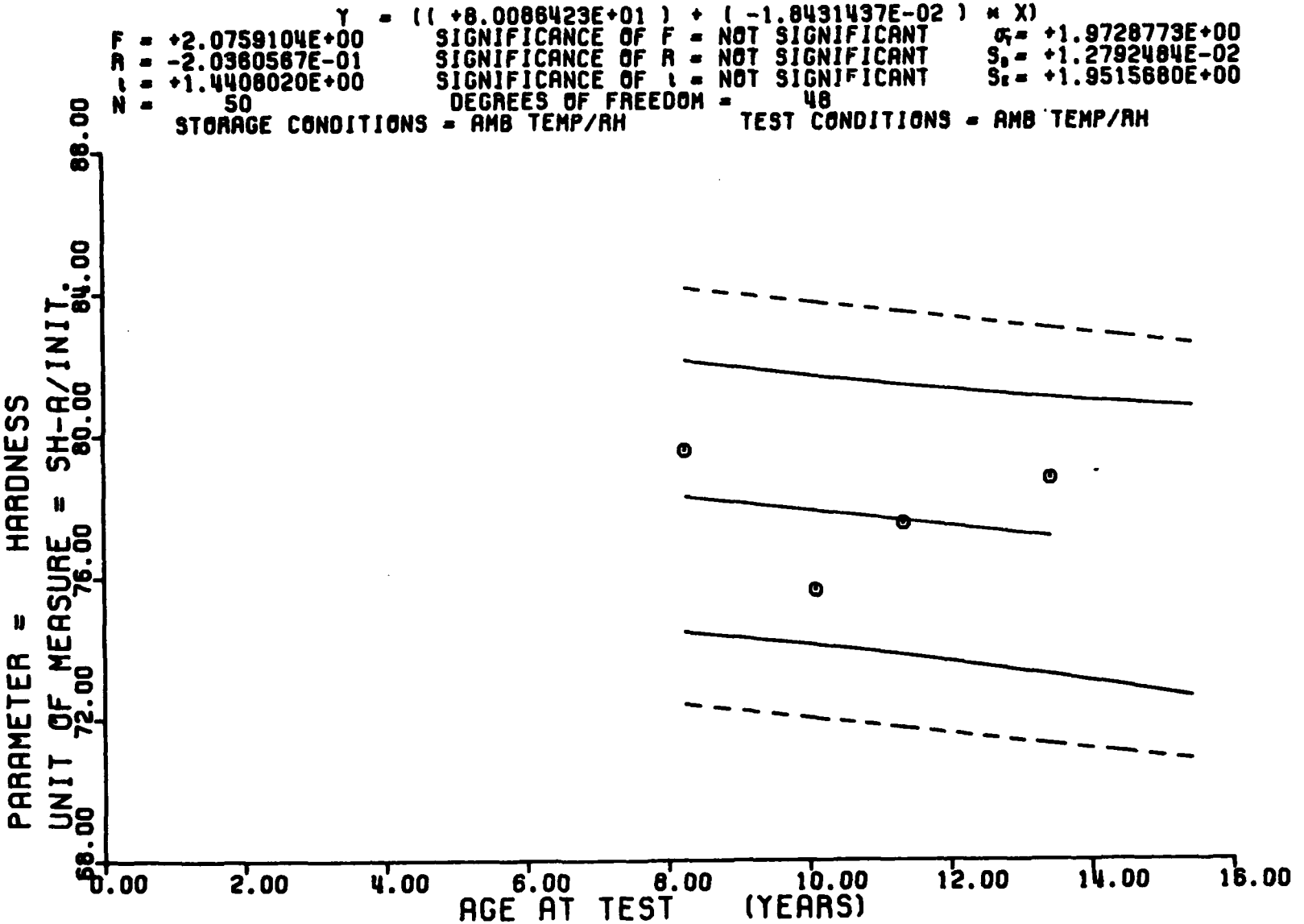

Y = ((+8.0086423E+01) + (-1.8431437E-02) * X)
F = +2.0759104E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σY = +1.9728773E+00
R = -2.0360567E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +1.2792484E-02
t = +1.4408020E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +1.9515680E+00
N = 50 DEGREES OF FREEDOM = 48
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = HARDNESS
UNIT OF MEASURE = SH-A/INIT.
88.00
84.00
80.00
76.00
72.00
68.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,HARDNESS,NON-GRNTD,SHORE-A,INITIAL. <0022583>

Figure 167

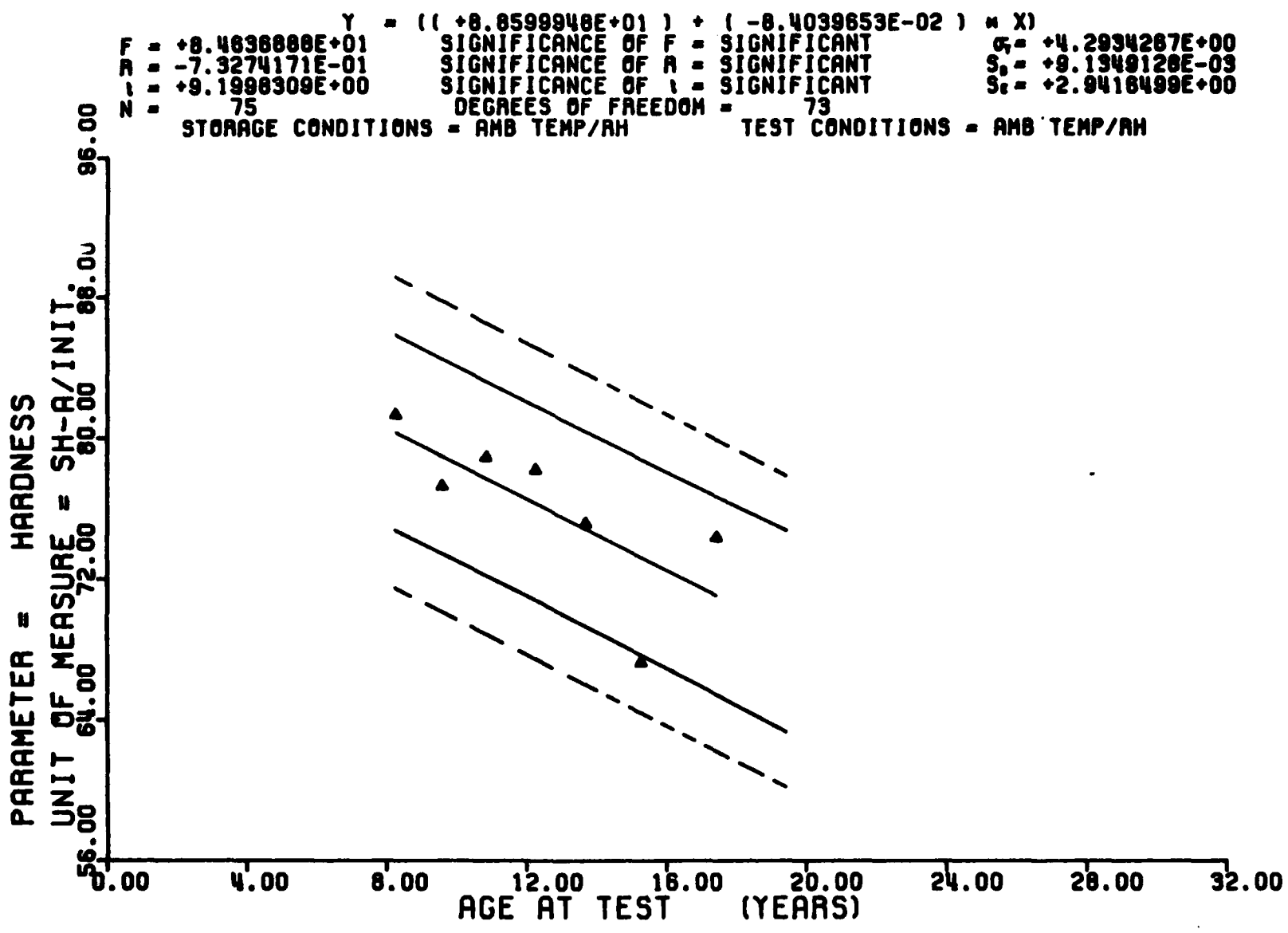
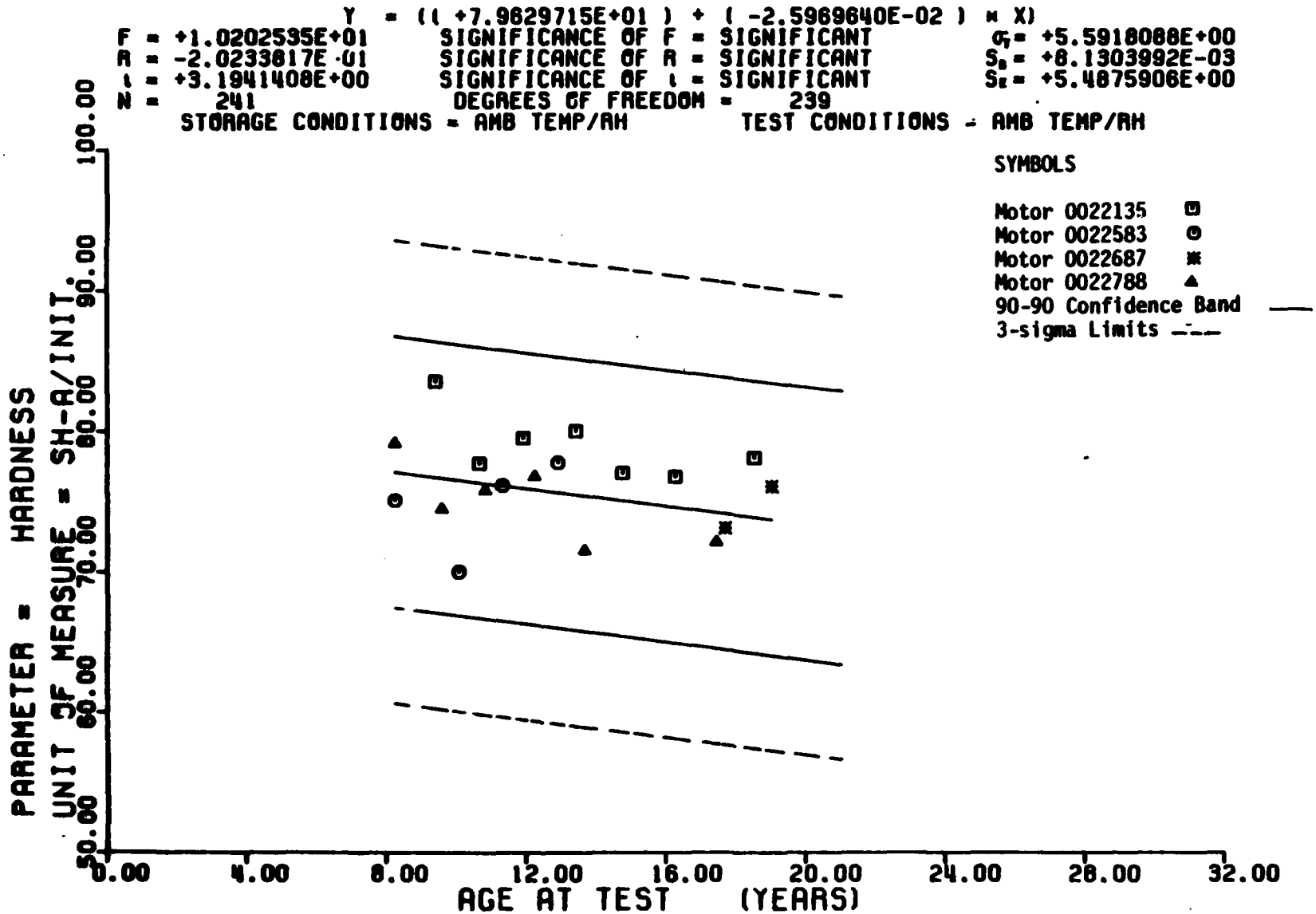
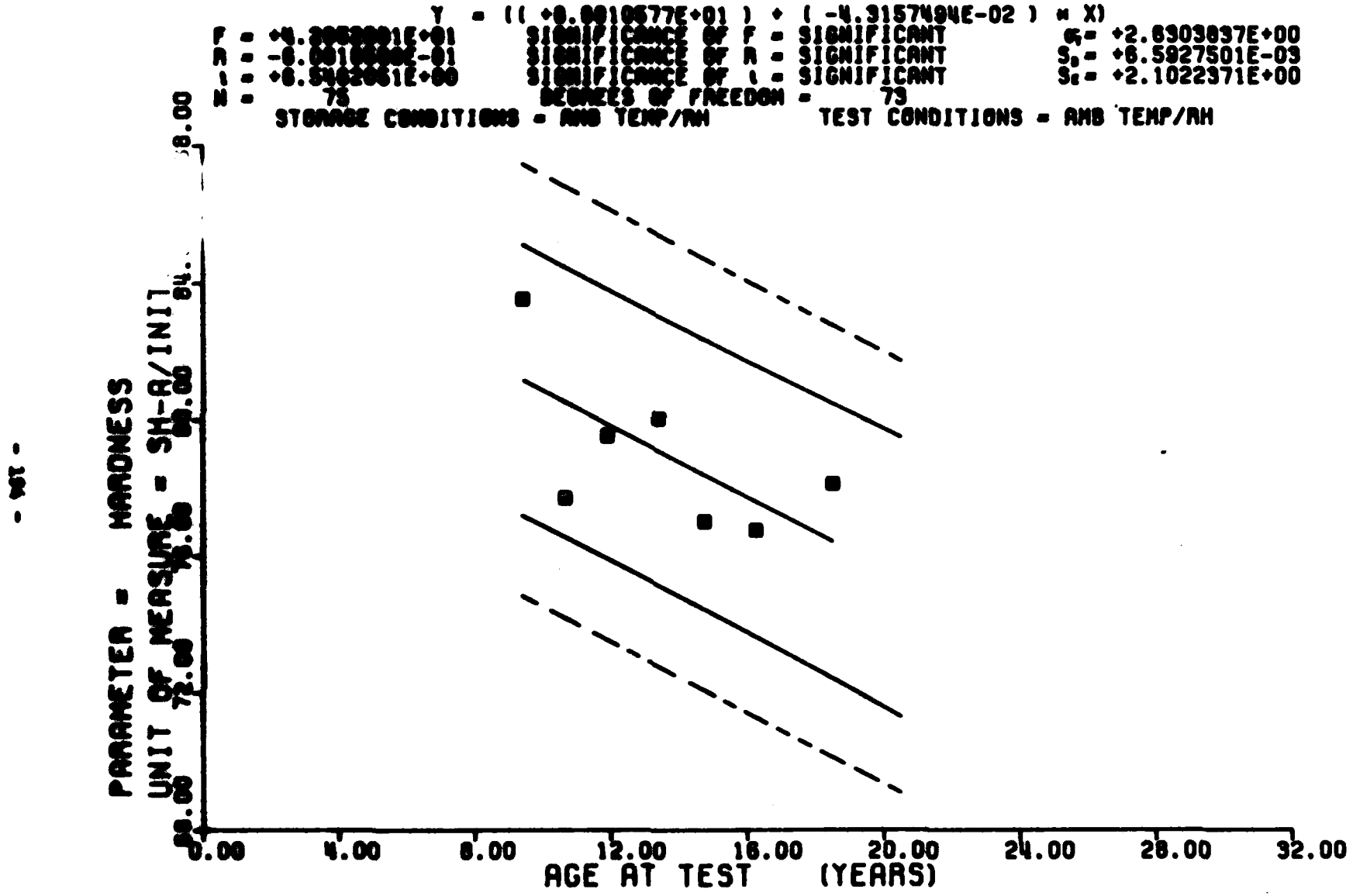

Y = ((+8.8599948E+01) + (-8.4039653E-02) * X)
F = +8.4636888E+01 SIGNIFICANCE OF F = SIGNIFICANT σ = +4.2934287E+00
R = -7.3274171E-01 SIGNIFICANCE OF R = SIGNIFICANT S_b = +9.1949128E-03
t = +9.1998309E+00 SIGNIFICANCE OF t = SIGNIFICANT S_t = +2.9416499E+00
N = 75 DEGREES OF FREEDOM = 73
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = HARDNESS
UNIT OF MEASURE = SH-A/INIT.
96.00
88.00
80.00
72.00
64.00
56.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,HARDNESS,NON-ORNTD,SHORE-A,INITIAL. <0022788>

Figure 168



II STAGE DSCT MTRS ONLY, INNER, HARDNESS, NON-ORNTD, SHORE-A, INITIAL.

Figure 169



II STAGE DSCT MTRS ONLY, INNER, HARDNESS, NON-GRNTD, SHORE-A, INITIAL. <0082135>

Figure 170

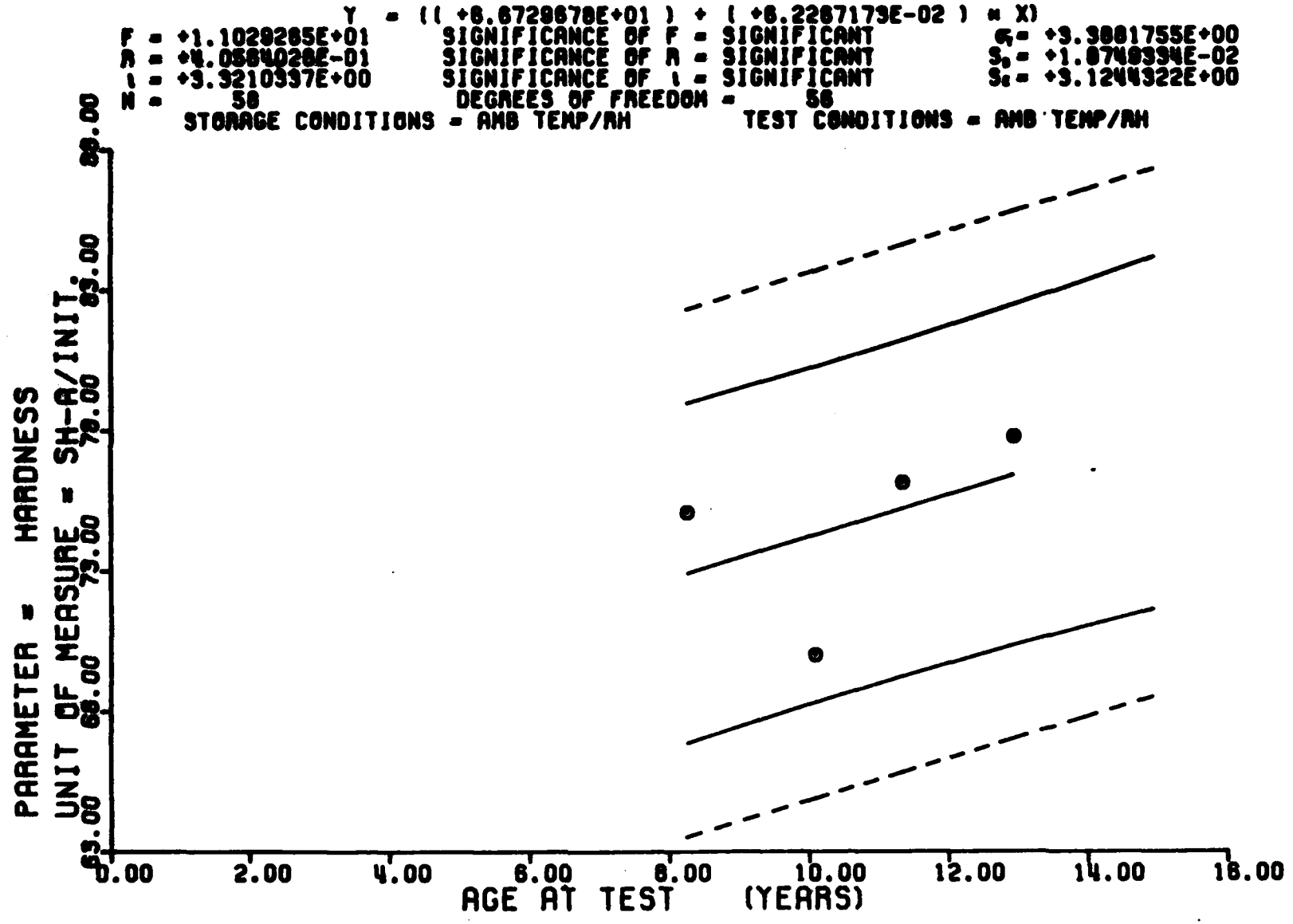

Y = ((+8.6729678E+01) + (+8.2287179E-02) * X)
F = +1.1029265E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +4.0584028E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +3.3210337E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 58 DEGREES OF FREEDOM = 56
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = HARDNESS
UNIT OF MEASURE = SH-A/INIT.
83.00
78.00
73.00
68.00
63.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, HARDNESS, NON-ORNTD, SHORE-A, INITIAL. <0022583>

Figure 171

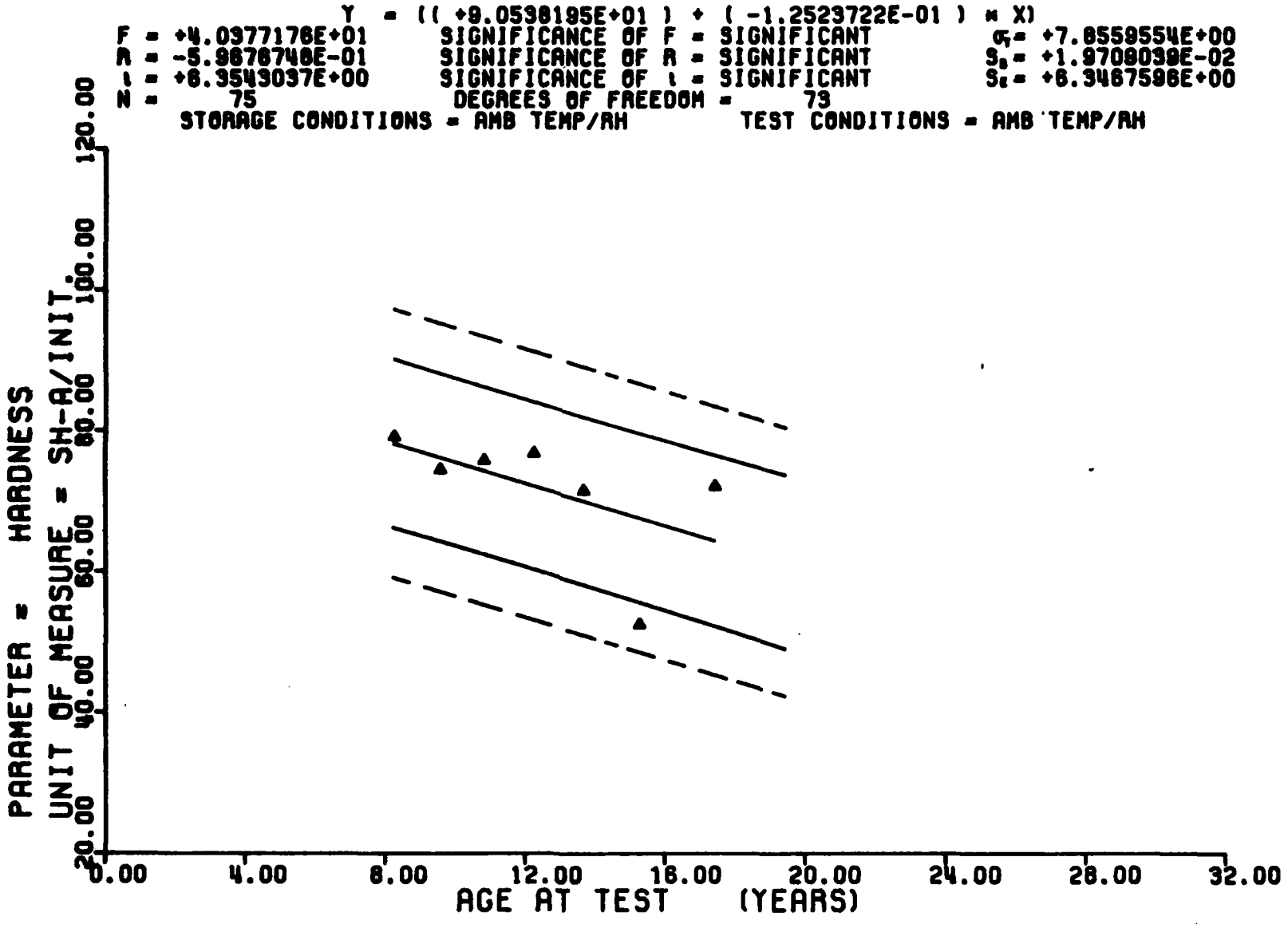
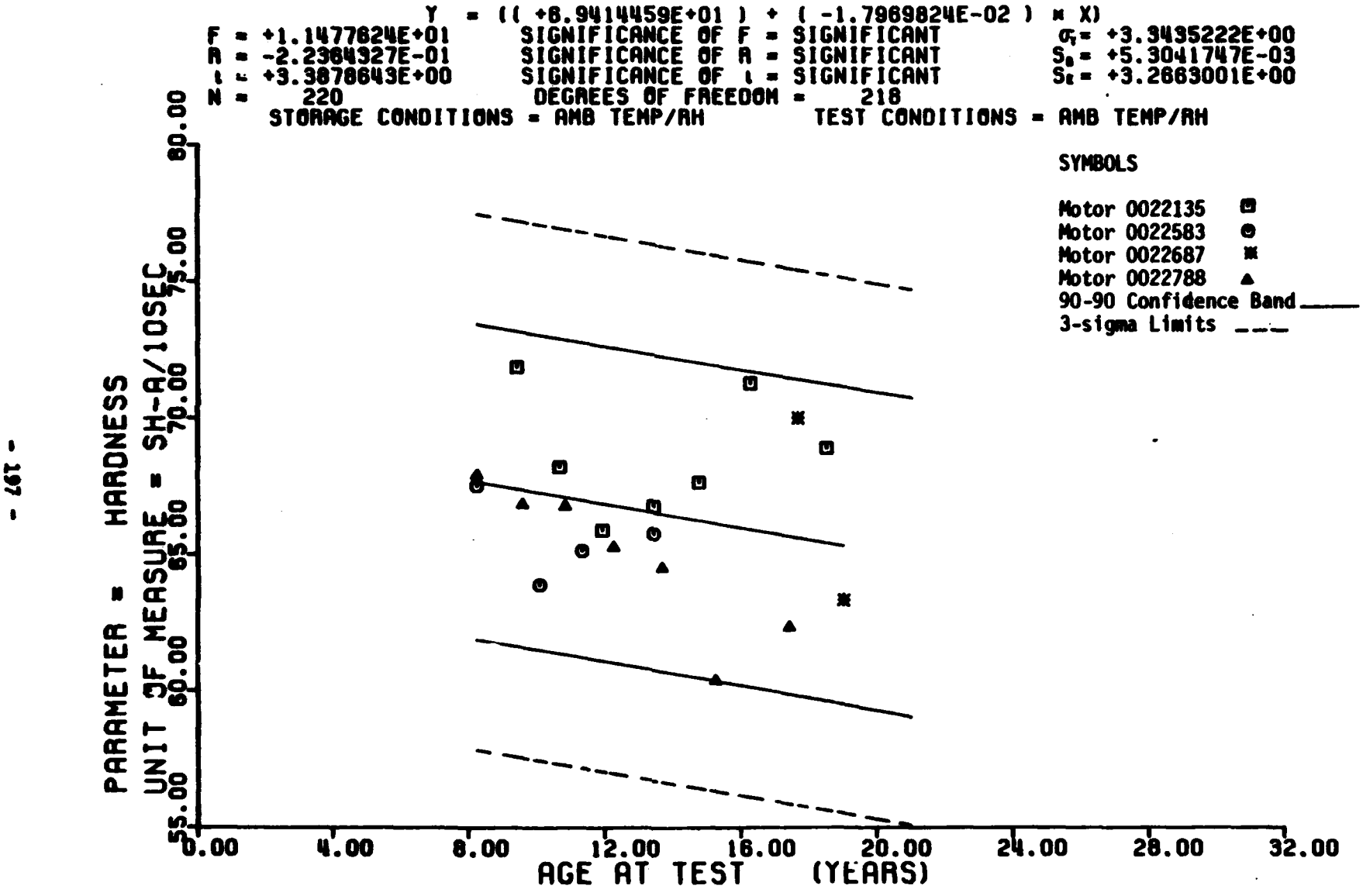

Y = ((+8.0598195E+01) + (-1.2523722E-01) * X)
F = +4.0377176E+01 SIGNIFICANCE OF F = SIGNIFICANT σt = +7.8559554E+00
R = -5.9876748E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.9708038E-02
t = +8.3543037E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +6.3487596E+00
N = 75 DEGREES OF FREEDOM = 73
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = HARDNESS
UNIT OF MEASURE = SH-A/INIT.
120.00
100.00
80.00
60.00
40.00
20.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, HARDNESS, NON-GRNTD, SHORE-A, INITIAL. <0022788>

Figure 172



II STAGE DSCT MTRS ONLY, OUTER, HARDNESS, NON-ORNTD, SHORE-A, 10-SEC.

Figure 173

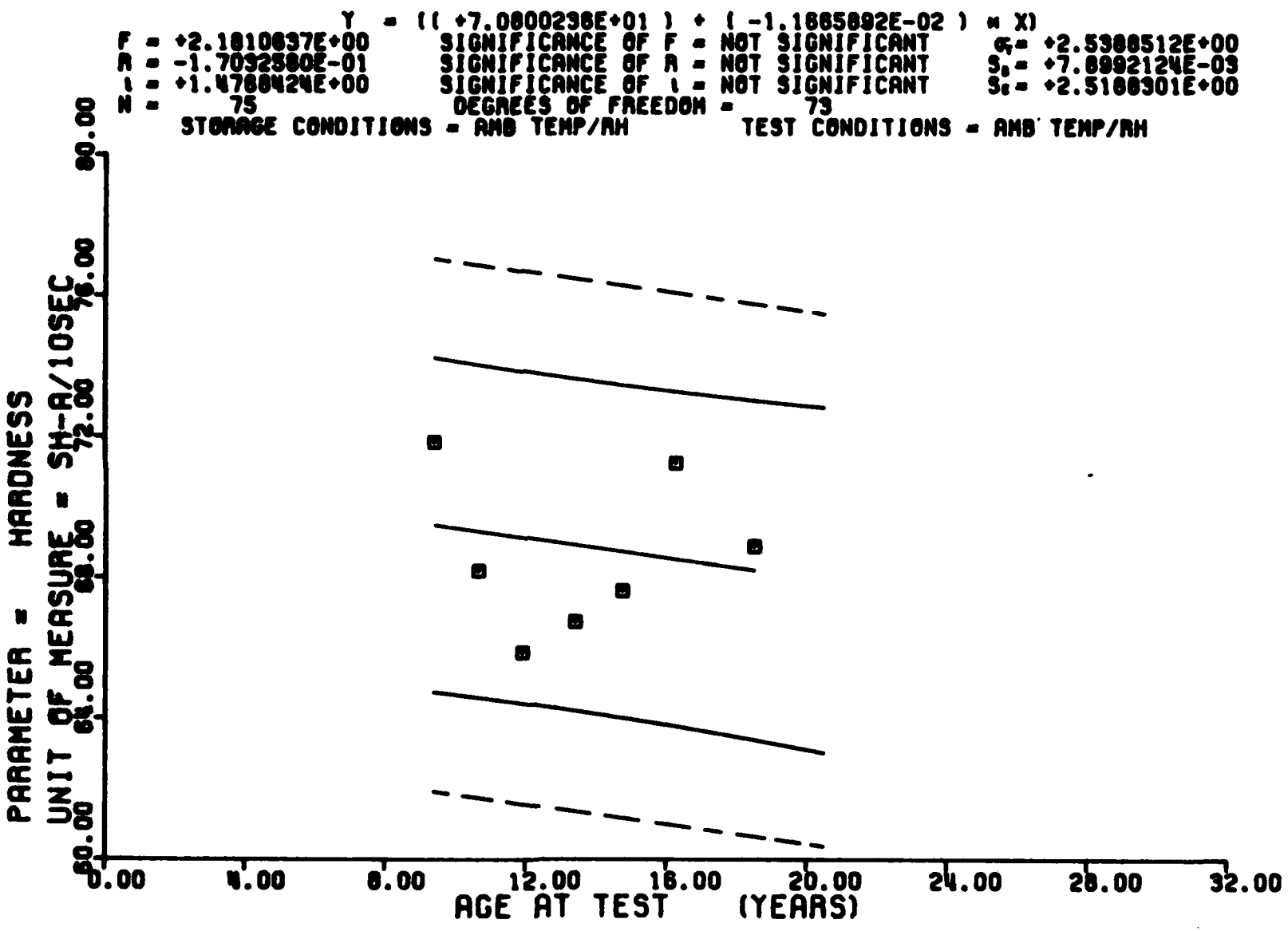

Y = ((+7.0800238E+01) + (-1.1665892E-02) * X)
F = +2.1810637E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σ = +2.5388512E+00
R = -1.7092580E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT S = +7.8992124E-03
I = +1.4788424E+00 SIGNIFICANCE OF I = NOT SIGNIFICANT S = +2.5188301E+00
N = 75 DEGREES OF FREEDOM = 73
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = HARDNESS
UNIT OF MEASURE = SH-A/10SEC
80.00
72.00
64.00
56.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY,OUTER,HARDNESS,NON-ORNTD,SHORE-A,10-SEC. <0022135>

Figure 174

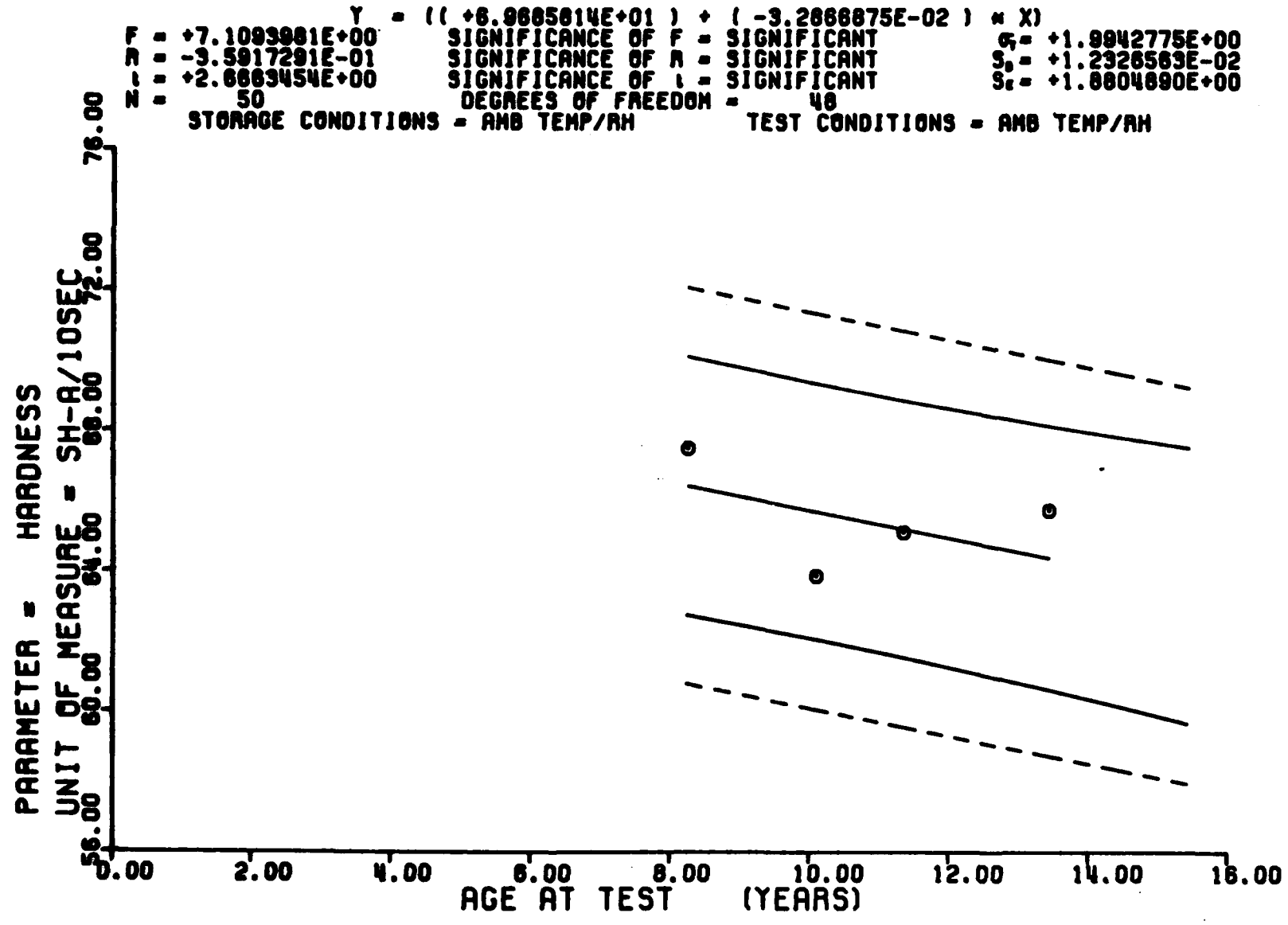

Y = ((+6.9665614E+01) + (-3.2866875E-02) * X)
F = +7.1093981E+00 SIGNIFICANCE OF F = SIGNIFICANT σt = +1.9942775E+00
R = -3.5917291E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.2326569E-02
i = +2.6663454E+00 SIGNIFICANCE OF i = SIGNIFICANT Sε = +1.8804890E+00
N = 50 DEGREES OF FREEDOM = 48
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = HARDNESS
UNIT OF MEASURE = SH-A/10SEC
76.00
72.00
68.00
64.00
60.00
56.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, OUTER, HARDNESS, NON-GRNTD, SHORE-A, 10-SEC. <0022583>

Figure 175

Y = ((+7.3960235E+01) + (-6.0983104E-02) * X)

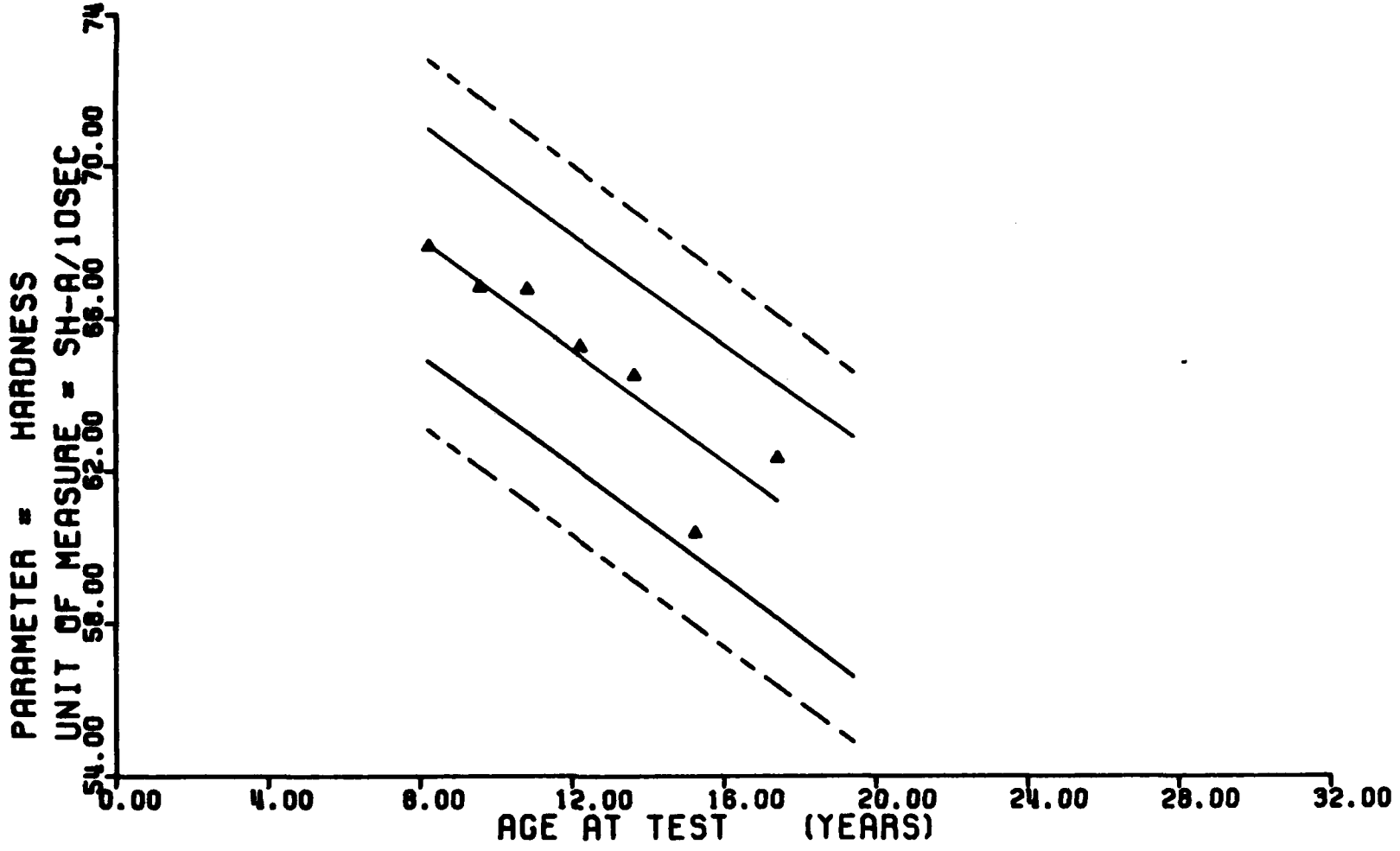
F = +1.4782835E+02 SIGNIFICANCE OF F = SIGNIFICANT σ_t = +2.7907827E+00

R = -8.1800179E-01 SIGNIFICANCE OF R = SIGNIFICANT S_b = +5.0190860E-03

t = +1.2150240E+01 SIGNIFICANCE OF t = SIGNIFICANT S_t = +1.6162600E+00

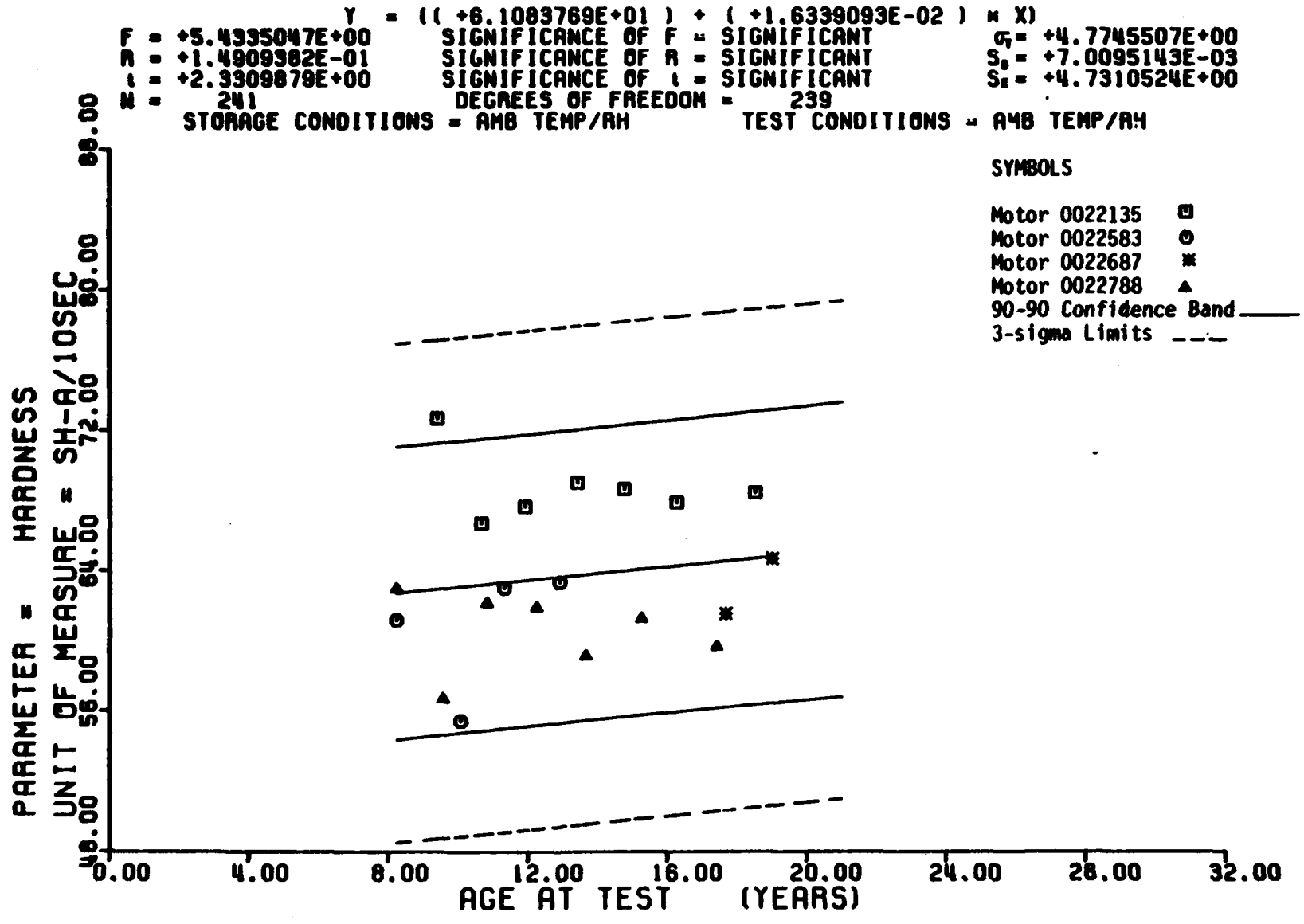
N = 75 DEGREES OF FREEDOM = 73

STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



II STAGE DSCT MTRS ONLY, OUTER, HARDNESS, NON-ORNTD, SHORE-A, 10-SEC. <0022788>

Figure 176



II STAGE DSCT MTRS ONLY, INNER, HARDNESS, NON-GRNTD, SHORE-A, 10-SEC.

Figure 177

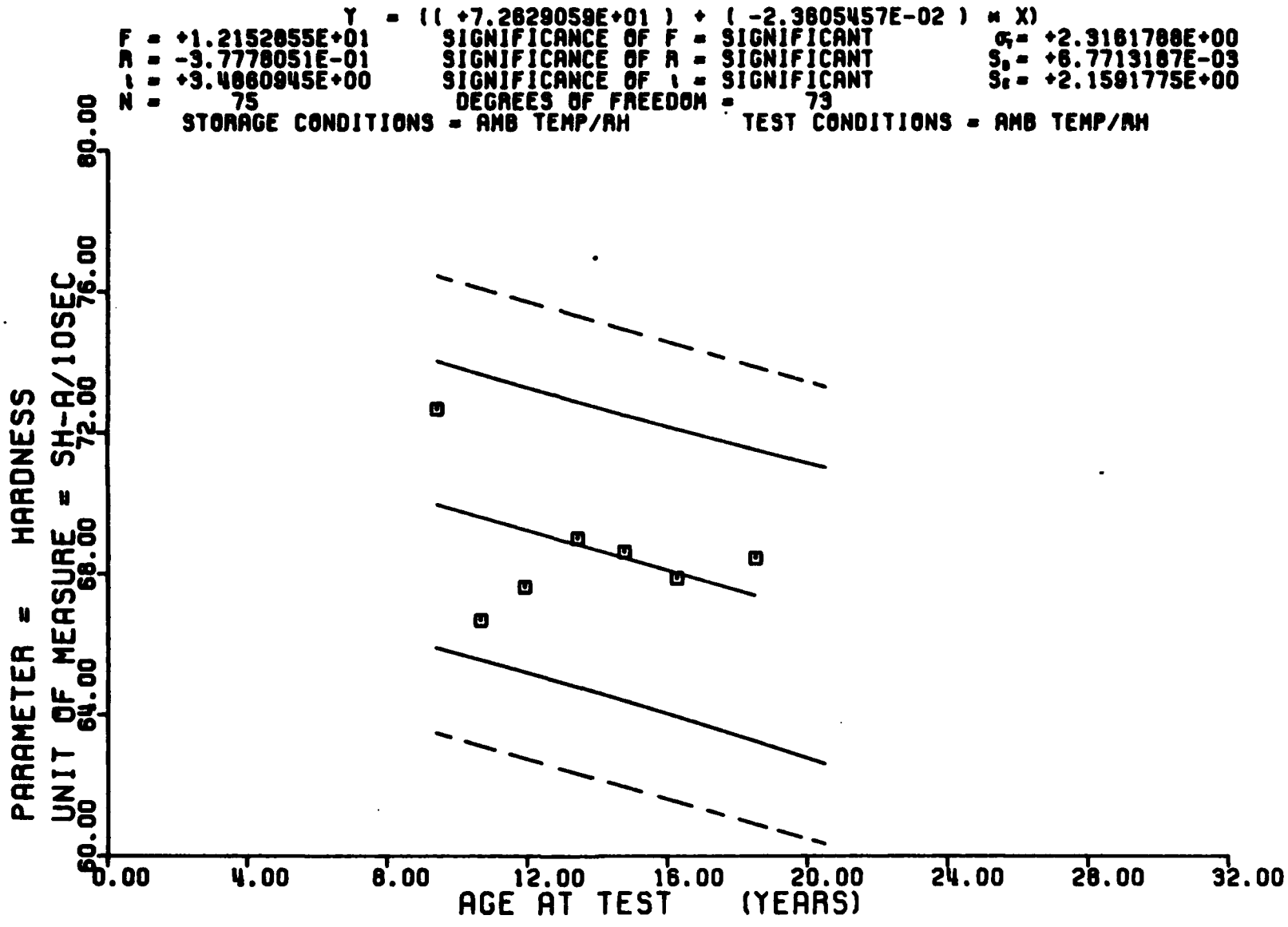

Y = ((+7.2629059E+01) + (-2.3805457E-02) * X)
F = +1.2152855E+01 SIGNIFICANCE OF F = SIGNIFICANT σ = +2.3161788E+00
R = -3.7778051E-01 SIGNIFICANCE OF R = SIGNIFICANT S = +6.7713187E-03
t = +3.4860945E+00 SIGNIFICANCE OF t = SIGNIFICANT S = +2.1591775E+00
N = 75 DEGREES OF FREEDOM = 73
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = HARDNESS
UNIT OF MEASURE = SH-A/10SEC
80.00
76.00
72.00
68.00
64.00
60.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE OSCT MTRS ONLY, INNER, HARDNESS, NON-ORNTD, SHORE-A, 10-SEC. <0022135>

Figure 178

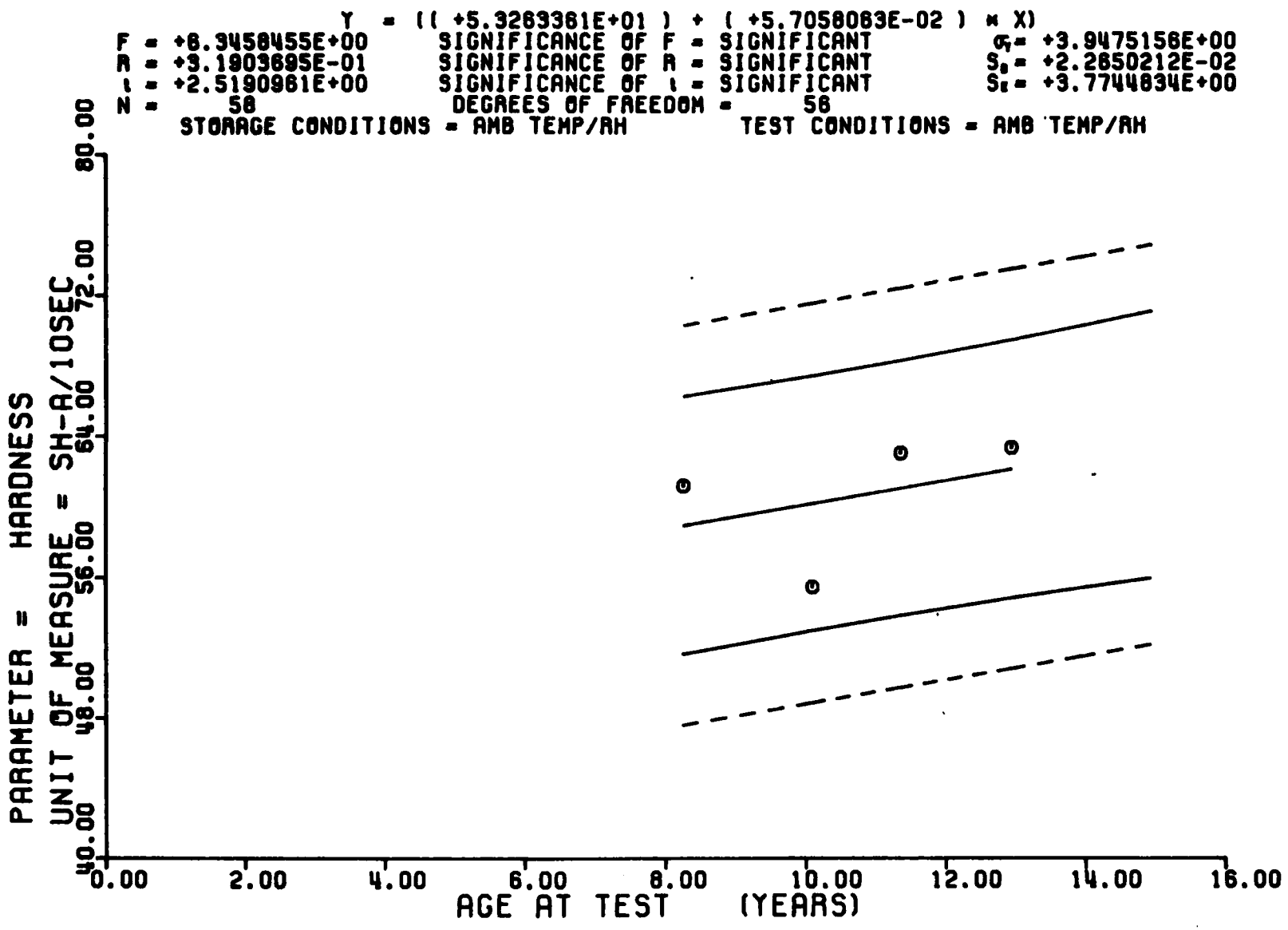

Y = ((+5.3263361E+01) + (+5.7058063E-02) * X)
F = +6.3458455E+00 SIGNIFICANCE OF F = SIGNIFICANT σr = +3.9475156E+00
R = +3.1803695E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +2.2850212E-02
t = +2.5190961E+00 SIGNIFICANCE OF t = SIGNIFICANT St = +3.7744834E+00
N = 58 DEGREES OF FREEDOM = 56
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = HARDNESS
UNIT OF MEASURE = SH-A/10SEC
80.00
72.00
64.00
56.00
48.00
40.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, HARDNESS, NON-ORNTD, SHORE-A, 10-SEC. <0022583>

Figure 179

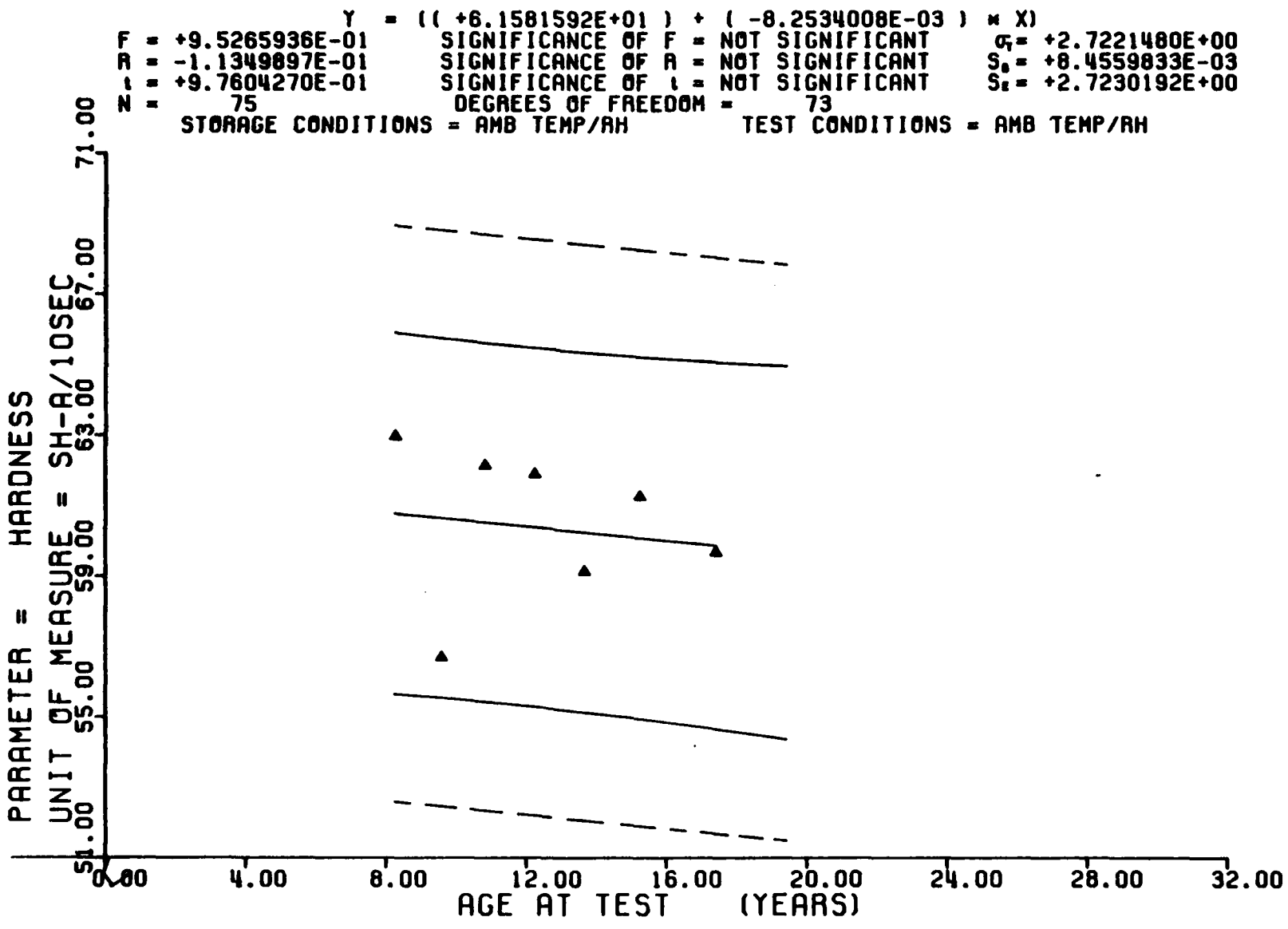

Y = ((+6.1581592E+01) + (-8.2534008E-03) * X)
F = +9.5265936E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σ_Y = +2.7221480E+00
R = -1.1349897E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT S_B = +8.4559833E-03
t = +9.7604270E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT S_E = +2.7230192E+00
N = 75 DEGREES OF FREEDOM = 73
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = HARDNESS
UNIT OF MEASURE = SH-A/10SEC
71.00
67.00
63.00
59.00
55.00
51.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
II STAGE DSCT MTRS ONLY, INNER, HARDNESS, NON-ORNTD, SHORE-A, 10-SEC. <0022788>

Figure 180

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dissected Motor Solid Propellant
Minuteman
RSLP

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Data analysis in this report is the culmination of testing on three dissected motors, as well as two test periods for a fourth dissected motor.

In order to relate the newest dissected motor to previously dissected motors, an analysis of covariance was performed. The new data was subjected to a determination of significance of means and variance. Regressions of individual motor trends for many parameters are included in this report.

Although these individual regressions do show some significant trends, it does not appear that age-out is imminent.

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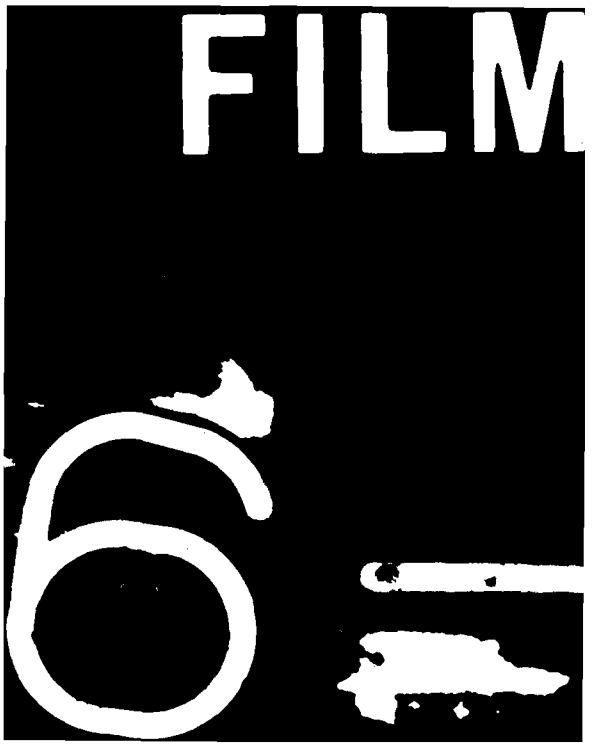
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